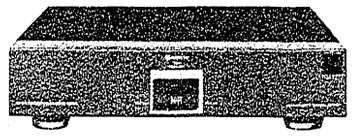
HITACHI

SERVICE MANUAL

TK | No. 3487E

VT-F551A,AW



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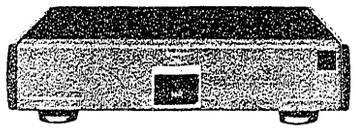

—VT-F551AW—

Technical Data

SPECIFICATIONS

Recording:	Rotary two head Helical Scan Azimuth Recording
Video:	NTSC Color EIA Standard
Cassette:	VHS Type
Heads:	5 video heads: 2 for SP 2 for EP 1 Flying erase head 2 Hi-Fi audio heads 1 Full track audio/video erase head 1 Combination head for control track, audio erase and audio record/play (3 heads/single housing)
Tape Speed:	33.35 mm/sec (SP), 16.67 mm/sec (LP) (playback only), 11.12 mm/sec (EP)
Tape Width:	12.7 mm
RF Output:	Channel 3 or Channel 4
RF Input:	UHF/VHF 75 ohm
Tuning Range:	VHF LOW CH, 2 ~ 6 (54 MHz — 88 MHz) VHF MID CH, A-5 ~ A-1 and A ~ I (90 MHz — 174 MHz) CATV VHF HIGH CH, 7 ~ 13 (174 MHz — 216 MHz) VHF SUPER CH, J ~ W (216 MHz — 300 MHz) CATV VHF HYPER CH, $W+1$ ~ $W+28$ (300 MHz — 468 MHz) CATV UHF CH, 14 ~ 69, $W+29$ ~ $W+84$ (470 MHz — 806 MHz)
Video Input:	1 — 2 Vp-p 75 ohm Unbalanced
Video Output:	1 Vp-p 75 ohm Unbalanced
Audio Input:	316 mV rms (—7.8 dB) 47 kohm
Audio Output:	316 mV rms (—7.8 dB) 1.5 kohm
Video Recording S/N:	Better than 46 dB (SP), Better than 40 dB (EP)
Horizontal Resolution:	240 lines (SP), 230 lines (EP)
Audio Response:	50 Hz — 10 kHz (SP), 100 Hz — 6 kHz (EP)
Audio S/N:	Better than 43 dB (SP), Better than 40 dB (EP)
Hi-Fi Audio	
Frequency Range:	20 Hz to 20 kHz
Dynamic Range:	90 dB
Wow and Flutter:	Less than 0.005% WRMS
Power Input:	AC 120V, 60 Hz (For A) AC 100—110V, 115—127V, 200—220V, 230-250V, 50/60 Hz (For AW)
Power Consumption:	25W Norninal (For A) 32W Nominal (For AW)
Cabinet Size:	17-1/8"(W) x 4-1/16"(H) x 15-1/16"(D) } (For A) 43.5(W) x 10.3(H) x 38.3(D) cm } 18-5/16"(W) x 4-1/16"(H) x 15-1/16"(D) } (For AW) 46.5(W) x 10.3(H) x 38.3(D) cm }
Weight:	15.6 lbs (7.1 kg) (For A) 17.4 lbs (7.9 kg) (For AW)
Accessories:	1 — Coaxial cable 1 — Remote control unit 3 — Batteries 1 — Audio/video connection cord 1 — Power plug adapter (For AW)

Design and Specifications subject to change without notice.

VHS

This video deck is a VHS type video recorder. For proper operation, only the VHS type cassette must be used.

MANUALS RELATED TO THE VT-F551A

Name of Manual	Language	Manual No.	Chapters included
Technical Data	English	3487E	Chapters 1-6
Adjustment	French	3489F	Chapters 3,4
Technical Information	English	3488E	———

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

VIDEO CASSETTE RECORDER

July 1991 TOKAI WORKS

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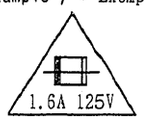
CAUTION AGAINST FUSE REPLACEMENT MARKING /
MESURE DE PRÉCAUTION À PRENDRE À PROPOS DES MARQUES DE FUSIBLE / :

CAUTION : FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH SAME TYPE AND SAME RATING FUSE IN ACCORDANCE WITH THE FUSE SYMBOL MARKING.
MESURE DE PRÉCAUTION : POUR ASSURER À L'APPAREIL UNE PROTECTION PERMANENTE CONTRE TOUT RISQUE D'AMORÇAGE ÉLECTRIQUE, REMPLACER UNIQUEMENT PAR UN FUSIBLE DE MÊME TYPE ET DE MÊME CATÉGORIE CONFORMÉMENT AUX MARQUES INDIQUÉES SUR LE FUSIBLE.

* Example / * Exemple



This symbol indicates Fast Operating Type 1.6A, 125V Fuse.
Ce symbole se rapporte à un fusible à fusion rapide de type 1,6A, 125V

SAFETY PRECAUTIONS

NOTICE: Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis.

1. When replacing a chassis in the instrument, all the protective devices must be put back in place, such as barriers, non-metallic knobs, adjustment and compartment covers/shields, isolation resistors/capacitors, etc.
2. When service is required, observe the original lead-dress. Extra precautions should be taken to assure correct lead dress in the high voltage circuit.
3. Always use the manufacturer's replacement components. Especially critical components as indicated on the circuit diagram should not be replaced by other manufacturer's. Furthermore, where a short-circuit has occurred, replace those components that indicate evidence of overheating.
4. Before returning an instrument to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the instrument by the manufacturer has become defective or inadvertently defeated during servicing.

Therefore, the following checks should be performed for the continued protection of the customer and service technician.

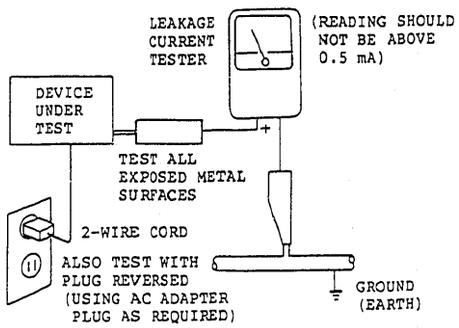
Leakage Current Cold Check

With the AC plug removed from the AC120V, 60Hz source, place a jumper across the two plug prongs. Turn the AC power switch on. Using an insulation tester (DC500V), connect one lead to the jumpered AC plug and touch the other lead to exposed metal parts (antennas, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistor reading of 0.3 Mohm and a maximum resistor reading of 5 Mohm. Any resistor value below or above this range indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

Leakage Current Hot Check

Plug the AC line cord directly into a AC120V, 60 Hz outlet (do not use an isolation transformer for this check).

Turn the AC power switch on. Using a "Leakage Current Tester", measure for current from all exposed metal parts of the cabinet (antennas, screwheads, metal overlays, control shaft, etc.), particularly an exposed metal part having a return path to the chassis, to a known ground (earth) (water pipe, conduit, etc.). Any current measured must not exceed 0.5 mA.


LEAKAGE CURRENT TESTER
(READING SHOULD NOT BE ABOVE 0.5 mA)
DEVICE UNDER TEST
TEST ALL EXPOSED METAL SURFACES
2-WIRE CORD
ALSO TEST WITH PLUG REVERSED (USING AC ADAPTER PLUG AS REQUIRED)
GROUND (EARTH)

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE UNIT TO THE CUSTOMER.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts have special safety-related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.
Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.
The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.
Product safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies of, HITACHI Service Manual may be obtained at a nominal charge from HITACHI SALES CORPORATION.

FOR CANADA

CAUTION AGAINST FUSE REPLACEMENT

FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH SAME TYPE AND SAME RATING FUSE IN ACCORDANCE WITH THE FUSE SYMBOL LABEL.

The following is the indication of the fuse symbol label which is affixed adjacent to the fuse in the equipment.

* Example

This symbol indicates Fast Operating Type 2A, 250V Fuse.

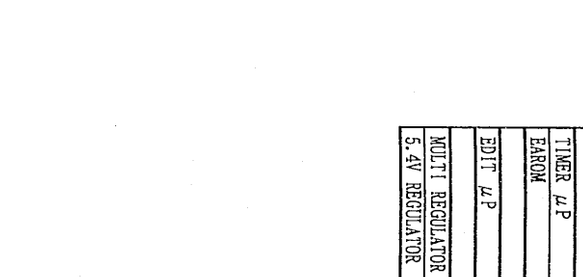
COMPARISON WITH PREVIOUS MODEL

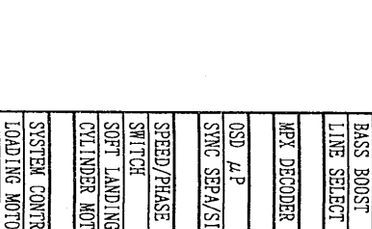
	ITEM	VT-F551A	VT-F540A
FEATURES	REC /PLAY SYSTEM	VHS Hi-Fi	VHS Hi-Fi
	COMB FILTER	USED (Y)	USED (Y/CHROMA)
	EDIT SWITCH	PROVIDED (RENTAL⇔NOR.⇔EDIT)	PROVIDED (ON⇔OFF)
	Hi-Fi MIX	PROVIDED (BY OSD)	PROVIDED
	SPECTRA SONIC (BASS BOOST)	PROVIDED (THEATER ⇔ MUSIC SWITCHABLE)	PROVIDED (THEATER ⇔ MUSIC SWITCHABLE)
	COLOR LEVEL CONTROL	NOT PROVIDED	PROVIDED
	SHARPNESS CONTROL	NOT PROVIDED	PROVIDED
	VIDEO DUB	PROVIDED	PROVIDED
	AUDIO DUB	PROVIDED	PROVIDED
	HIGH-SPEED SEARCH	PROVIDED	PROVIDED
	HIGH-SPEED REWIND	PROVIDED	NOT PROVIDED
	JOG/SHUTTLE ON VCR	NOT PROVIDED (REMO-CON ONLY)	PROVIDED (NON-LOCKING SHUTTLE)
	ASSEMBLE EDIT	PROVIDED (UP TO 6 PROGRAMS)	PROVIDED (UP TO 8 PROGRAMS)
	TITLE	NOT PROVIDED	PROVIDED (BY REMOTE CONTROL/ VCR FRONT PANEL)
	COUNTER GO-TO	PROVIDED (BY REMOTE CONTROL)	PROVIDED (BY REMOTE CONTROL/ VCR FRONT PANEL)
	TAPE REMAINING DISPLAY	PROVIDED (WITH BAR GRAPHS)	PROVIDED (WITH BAR GRAPHS)
	LINEAR TIME COUNTER	PROVIDED	PROVIDED
	AUDIO MONITER	PROVIDED	NOT PROVIDED
	TAPE RETURN	PROVIDED	PROVIDED
	BLANK SEARCH	NOT PROVIDED	NOT PROVIDED
	REPEAT	PROVIDED	NOT PROVIDED
	EDIT IN/OUT JACKS	PROVIDED	PROVIDED
	AUTO TRACKING	PROVIDED	PROVIDED
	EXT. IN JACKS ON FRONT	LINE 1 / LINE 2 BUILT-IN	LINE 1 / LINE 2 SWITCHABLE
	AUDIO OUTPUT CONTROL	PROVIDED (HEADPHONE VOLUME CONTROL)	PROVIDED (HEADPHONE VOLUME CONTROL)
	OFF TIMER	PROVIDED (UP TO 99 MINUTES)	PROVIDED (UP TO 99 MINUTES)
	TIMER REC PROGRAMMING	BY REMOTE CONTROL	ON MONITOR SCREEN
	CLOCK SETTING	BY REMOTE CONTROL	ON MONITOR SCREEN
	TIME CORRECTION	BY REMOTE CONTROL	ON MONITOR SCREEN
	VCR MODE SELECTION	PROVIDED (7 ITEMS)	PROVIDED (4 ITEMS)
	VISS	PROVIDED	PROVIDED
	OSD COLOR BACKGROUND	PROVIDED (ONLY BLUE)	PROVIDED (ONLY BLUE)
	OSD COLOR BACKGROUND RELEASE	PROVIDED	NOT PROVIDED
	TIMER REC SPEED SELECTION	PROVIDED	PROVIDED
	TIMER REC PROGRAMS	8 PROGRAMS / 1 YEAR	8 PROGRAMS / 1 YEAR
	HEADPHONE JACK/VOLUME	PROVIDED	PROVIDED
	CLOCK/REMAINING TIME SWITCH	REMOTE CONTROL	REMOTE CONTROL / VCR
	REMOTE CONTROL PROGRAM MEMO	8 PROGRAM	NOT PROVIDED
	SPEED ERASE	PROVIDED	NOT PROVIDED
CHASSIS	BASIC CHASSIS TYPE	ZF (FULL LOADING)	ZF (FULL LOADING)
	HALF LOADING MECHANISM	NOT NECESSARY	NOT NECESSARY
	HEADS ON CYLINDER	SX5 HEADS + Hi-Fi SP VIDEO REC/PLAY : 2 EP VIDEO REC/PLAY : 2 FLYING ERASE : 1 AUDIO REC/PLAY : 2	SX5 HEADS + Hi-Fi SP VIDEO REC/PLAY : 2 EP VIDEO REC/PLAY : 2 FLYING ERASE : 1 AUDIO REC/PLAY : 2
	FLYING ERASE HEAD	PROVIDED	PROVIDED
	HEAD CLEANING MECHANISM	PROVIDED	PROVIDED

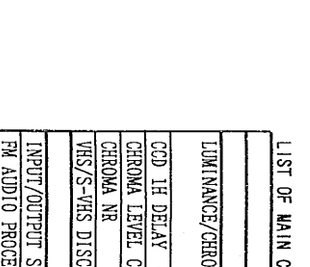
LIST OF MAIN CONTROL IC MODELS

ITEM	VT-F551A		VT-F540A	
	VIDEO CIRCUIT			
LUMINANCE/CHROMA PROCESS	HT7263 -F551A-	(IC201)	HA11813ANT	(IC201)
	HT7253 -F551AW-	(IC201)		
CCD 1H DELAY	MSM7400R	(IC203)	MSM7400RS	(IC203)
CHROMA LEVEL CONTROL	———		NJM2225D	(IC205)
CHROMA NR	———		HA118064FP	(IC202)
VHS/S-VHS DISCRI.	HTS7152	(IC205)	———	
	AUDIO CIRCUIT			
INPUT/OUTPUT SELECT	Included in IC501		BA7730S	(IC501)
FM AUDIO PROCESS	XRA7703KP	(IC501)	XRA7700K1	(IC502)
LINEAR AUDIO PROCESS	XRA7767A	(IC401)	XRA7767AS	(IC401)
BASS BOOST	RC4558D	(IC1531/1532)	RC4558	(IC1531/1532)
LINE SELECT SW	M5201L	(IC304/305)	BU4053	(IC1511)
	MPX DECODE CIRCUIT			
MPX DECODER	CXA1138AS	(IC1301)	SBX1475	(IC1301)
	OSD CIRCUIT			
OSD μP	M50658-113SP	(IC1401)	M50554-149SP	(IC1401)
SYNC SEPA/SIGNAL DET	NJM2229S	(IC1402)	NJM2229S	(IC1402)
	SERVO CIRCUIT			
SPEED/PHASE CONTROL	HD49741N	(IC601)	HD49741NT	(IC601)
SWITCH	———		μPD4066C	(IC652)
SOFT LANDING CONTROL	———		BA6303	(IC651)
CYLINDER MOTOR DRIVER	XRA6459P1	(IC602)	BA6459P1	(IC1651)
	SYSTEM CONTROL CIRCUIT			
SYSTEM CONTROL μP	μPD75516-295	(IC901)	HD404019A	(IC901)
LOADING MOTOR DRIVE	XRA6209U4	(IC902)	BA6209U4	(IC902)
COMPARATOR	———		ERE CIRCUIT BOARD	
AUTO TRACKING μP	M50927-218SP	(IC1901)	M50727-141SP	(IC971)
TRACKING CONTROL	———		AE CIRCUIT BOARD	
METER CONTROL	BA6138	(IC502)	BA6138L	(IC1501)
	TIMER CIRCUIT			
TIMER μP	M38102M5-120SP	(IC701)	M50959-284SP	(IC751)
EAROM	XRM9021A	(IC702)	XRA9021	(IC752)
	EDIT CIRCUIT			
EDIT μP	———		M50747-804	(IC671)
	REGULATOR CIRCUIT			
MULTI REGULATOR	———		STK7271	(IC851)
5.4V REGULATOR	PQ30RV11	(IC2851)	———	

CONTROLS AND FEATURES

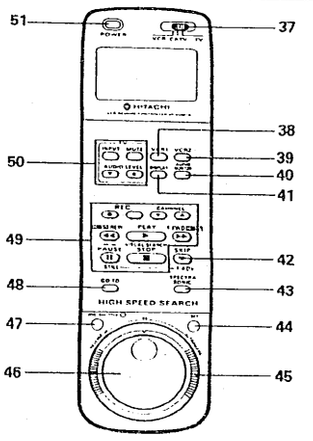






1. **VIDEO IN**
   Receives video signal from a video camera or another VCR.
2. **AUDIO IN**
   Receive audio signals from a stereo system or another VCR. AUDIO IN (L) handles the left-channel stereo sound or monaural sound. If you connect an audio source to only AUDIO IN (L), the same sound is recorded on Hi-Fi tracks (L) and (R) in monaural.
   Notes: There are AUDIO IN/VIDEO IN jacks on both the front and rear panels. The front jacks have priority over the rear jacks. Do not connect any equipment to the jacks on the front panel when using the AUDIO IN/VIDEO IN jacks on the rear panel.
3. **EDIT IN JACK**
   Connect the pause cable of a video camera here. Starting and stopping recording can be controlled by operating the start/stop button on the camera. To synchro edit, connect this jack to the other VCR's EDIT OUT jack.
4. **CASSETTE COMPARTMENT**
   Insert a cassette in through a door, and loading will be completed automatically.
   Note: Power is turned on automatically when the cassette is loaded.
5. **TIMER INDICATOR**
   Will light when turning power off after programming.
6. **POWER INDICATOR**
   Will light when the power is turned on.
7. **Hi-Fi INDICATOR**
   Will light when the Hi-Fi mode is selected by using AUDIO MONITOR button.
8. **TAPE-IN INDICATOR**
   Lights when cassette is loaded in the compartment.
9. **RECORD INDICATOR**
   Lights during recording.
10. **VIDEO SELECT SWITCH**
    Use this switch to adjust the played back pictures.
    SHARP: Select this position when using this VCR for playback when dubbing a tape. This will reduce the deterioration of pictures.
    NORMAL: Normally select this position.
    SOFT: Tapes played many times, including rental tapes, cause coarseness in the played back pictures. Select this position for such tapes to reduce noise.
11. **DISPLAY**
12. **PHONES SOCKET**
    Plug in a stereo headphone for private listening.
13. **PHONES LEVEL CONTROL**
    For adjusting headphone volume. Turning this knob also adjusts output from audio output jack 2.
14. **INFRARED RAY RECEIVING SECTION**
    Receives the infrared ray from remote control unit.
15. **POWER BUTTON**
    Turn system power on and off.
16. **EJECT BUTTON**
    When this button is pressed in modes other than recording, the tape stops, and the cassette is ejected.
17. **REWIND BUTTON**
    Press to start rewind.
    Press this button during playback, and reverse playback picture at high speed can be seen.
18. **PLAY BUTTON**
    Press to start play.
    Note: When the cassette (with erase prevention tab removed) is loaded, playback starts automatically.
19. **FAST FORWARD BUTTON**
    Press to activate fast forward.
    Press this button during playback, and forward playback picture at high speed can be seen.
20. **STOP BUTTON**
    Press to stop tape. The STOP button must be pressed between "RECORD" and any other operation.
21. **PAUSE/STILL BUTTON**
    Press to pause during recording or playback.
22. **CHANNEL SELECT BUTTONS**
    Select the channels you wish to view or to record by pressing these buttons.
23. **RECORD BUTTON**
    Press to start recording.
24. **IRT START BUTTON**
    IRT allows unattended recording without programming the timer.
25. **V.DUB BUTTON**
    Turns the video dubbing features on. To turn this feature off, press STOP button.
26. **A.DUB BUTTON**
    Turns the audio dubbing features on. To turn this feature off, press STOP button.
27. **SPEED ERASE BUTTON**
    Press to erase the previously recorded material at high speed.
28. **HIGH SPEED REWIND BUTTON**
    Press to rewind tape at high speed.
29. **ANTENNA OUTPUT**
    Connect this terminal to the antenna terminal on the back of the TV.
30. **RF CONVERTER SWITCH**
    Set this switch to whichever channel (CH3 or CH4) is unused in your area.
31. **VIDEO IN**
    Receives video signal from a video camera or another VCR.
32. **AUDIO IN**
    Receive audio signals from a stereo system or another VCR. AUDIO IN (L) handles the left-channel stereo sound or monaural sound. If you connect an audio source to only AUDIO IN (L), the same sound is recorded on Hi-Fi tracks (L) and (R) in monaural.
33. **EDIT OUT JACK**
    Connect the EDIT OUT jack to the EDIT IN jack of the recording VCR in order to synchro edit with this VCR in play mode.
34. **AUDIO OUT**
    For a connection to a monitor or another VCR. Output from AUDIO OUT 2 can be varied by the front panel's PHONES LEVEL control.
35. **VIDEO OUT**
    For connection to monitor TV.
36. **ANTENNA INPUT**
    Connect the UHF and/or VHF antenna to this terminal.

CONTROLS AND FEATURES (Continued)

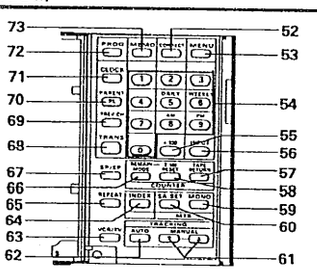


37. **VCR/CATV/TV SELECT SWITCH**
VCR: Select this position when using the remote control to operate the VCR.
CATV: Select this position to operate the cable converter.
TV: Select this position to operate the TV.

38. **VCR1 BUTTON**
If "VCR 1" is not displayed in the remote control's display, press this button to operate the VCR using the remote control provided and then press the button which corresponds to the function you want.

39. **VCR2 BUTTON**
Press this button when using another Hitachi VCR and operating the remote control provided to control the two VCRs.

40. **AUDIO MONITOR BUTTON**
For audio selection during playback. Press AUDIO MONITOR button to change audio from Hi-Fi to Linear and back again. Normally, select Hi-Fi audio. When Hi-Fi audio is selected, Hi-Fi indicator and [L] and [R] on the level meter will light.



41. **DISPLAY BUTTON**
1st Press .... Calls up the mode display on TV screen.
2nd Press (before display disappears) ... Erases the display, leaving the display at the bottom of the screen as it is.
3rd Press .... Defeats the display function. Useful to prevent the On-screen display recording.

42. **SKIP/F.ADV BUTTON**
Press this button during playback for forward high-speed search that lasts for about 30-seconds of playing time, then goes back to normal play mode. Press this button during still playback to advance the picture by one frame.

43. **SPECTRA SONIC BUTTON**
Permits the emphasis of the bass sound from the AUDIO OUT and HEADPHONE jacks.

44. **SET BUTTON**
Press this button when using the program synchro edit function. Refer to page 49

45. **SHUTTLE RING**
During play, turn this ring to speed up or slow down playback speed at a smooth variable rate for everything from slow motion to forward search. Removing the hand from the ring restores a still picture.

46. **JOG DIAL**
Every turn of the jog dial to a click position during still play moves the tape forward one frame at a time.

47. **JOG/SHUTTLE ON/OFF BUTTON**
Press this button to make the lamp above the button light when using the jog/shuttle on the remote control. The lamp goes out when the button is pressed again. When the lamp is off, you cannot operate the jog/shuttle on the remote control.

48. **GO-TO BUTTON**
Use linear time counter to move tape so many minutes forward or backward from the present position.

49. **VCR CONTROL BUTTONS**
These buttons (except for "REC" buttons) function same as the buttons on your VCR.
Note: The REC buttons must be pressed simultaneously to start recording.

50. **TV CONTROL BUTTONS**
Used for controlling the TV.

51. **POWER BUTTON**
Turn system power on and off.

52. **CORRECT BUTTON**
Used for programming the timer.

53. **MENU BUTTON**
Use MENU button to set the clock or program timer, to check or cancel timer programming, to operate the off-timer function, or to change VCR modes.

54. **NUMBER BUTTONS "0" THROUGH "9"**
Select any channel (whether or not it is in the "Tuner Scan List") by pressing two buttons. (Press "0" and then "8" for channel 8.) The number buttons are also used for setting the clock and programming the timer.

55. **100 BUTTON**
Used to select TV or CATV channels.
Press "100", "2", "3" in this order to select channel 123. Press "100", "0" and "5" for channel 105.

56. **INPUT BUTTON**
Press to select tuner position to record or view an off-the-air TV program (through the VCR's built-in tuner) or the "L" position to record or view the program input through the video and audio line input jacks.

57. **RETURN BUTTON**
Press RETURN button to bring the tape back to the position where the linear time counter reads "0:00.00".

58. **RESET/T-160 BUTTON**
Resets linear time counter to "0:00.00" when the linear time counter is displayed and automatically compensates the Tape Remaining display for using T-160 tapes when Tape Remaining mode is selected.

59. **MONO BUTTON**
When a stereo broadcast is received but the stereo signal is noisy from a weak signal station, for example, press the button to turn on monaural mode. The audio you receive will be monaural. Monaural reception may be better than a noisy stereo signal. Normally press this button to turn off the monaural mode.

60. **SAP SET (Second Audio Program) BUTTON**
Press this button to turn on "SA SET" indicator on the TV screen to record the SA (Second Audio Program) broadcast. Normally press the button again to turn off the "SA SET" indicator on the TV screen.

61. **TRACKING CONTROL BUTTONS**
To minimize noise in playback.

62. **AUTO TRACKING BUTTON**
When playback is started, the auto tracking function operates normally even if this button is not pressed. When this button is pressed after tracking has been adjusted manually, auto tracking operates again.

63. **VCR/TV SELECT BUTTON**
Selects the signal to be viewed.
The "VCR" appears for about 5 seconds when the unit is in VCR mode and the signal received by the VCR is displayed on the TV screen. With the "TV" selected ("TV" appears for about 5 seconds), the broadcast signal is received directly by your TV set. When the VCR power is turned off, the VCR automatically switches to "TV".

64. **INDEX BUTTON**
Activates the Program Index System. An on-screen display appears on the TV prompting you to enter a program number.

65. **REPEAT BUTTON**
Press to repeat play.

66. **COUNTER/REMAIN SELECT BUTTON**
The VCR display changes in the order clock, linear time counter, tape remaining and back to clock each time this button is pressed.

CONTROLS AND FEATURES (Continued)

67. **TAPE SPEED SELECT BUTTON**
Recording time using Cassette tape T-160:
EP: 8 hours SP: 2.6 hours
Notes:
- Playback speed automatically corresponds with recorded speed.
- This VCR cannot record in LP mode, but can play LP recorded tapes.

68. **TRANS BUTTON**
Press TRANS button to transmit the programmed information to the VCR.

69. **PREV CH BUTTON**
Used to control the TV.

70. **PL (Parent Lock) BUTTON**
When this button and button "6" are pressed simultaneously, no button on the front panel of the VCR can be operated. This prevents children from operating the VCR without their parents approval.
To release the lock, press the PL button and button "6" simultaneously or press the POWER button of the remote control.

71. **CLOCK BUTTON**
Used to control clock.

72. **PROG BUTTON**
Used for programming the timer.

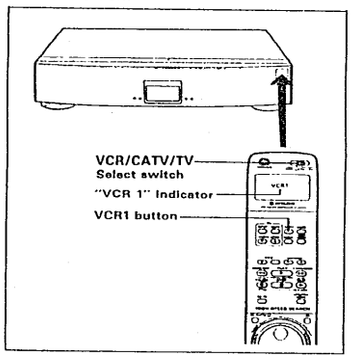
73. **MEMO BUTTON**
Press this button to store the information programmed for the timer in the memory of the remote control.

USING THE REMOTE CONTROL UNIT

HOW TO INSTALL BATTERIES

NOTES:
1. Be sure to install three "AA" size batteries before use.
2. Be aware of the polarity.

Aim the remote control at the receiver on the front panel of the VCR.



NOTES:
1. If the range is short, try new batteries.
2. An object in between the VCR and remote control unit may block the invisible light beam and operation will not be possible.
3. If you cannot operate the VCR with this remote control, first set the VCR/CATV/TV select switch to "VCR". Check that "VCR 1" appears in the remote control's display and then press the button which corresponds to the VCR function you want.
   - If "VCR 1" is not displayed in the remote control's display, press the VCR1 button.

INSTALLATION — INTRODUCTION & ANTENNA SYSTEM

INTRODUCTION

Place your Video Cassette Recorder (VCR) in a horizontal position on a solid, stable surface near your TV. Connect the VCR AC plug into a non-switched AC outlet. Before you can use your VCR, the TV antenna connection must be moved to the VCR. Then new connections must be added from the VCR to the TV. An accessory for common connections is included with your VCR. If your installation requires other accessories, they may be purchased at your Dealer or Electronic Parts Stores. There are several installations shown in the following figures. Select the figure which best matches your TV signal source, equipment features, and operating needs. TV broadcasts in your area may be VHF, UHF, or both. In a UHF-only area, use figure A3 for VHF and UHF connections between the VCR and TV. The VHF connection from VCR to TV is always needed for the VCR output channel of VHF Channel 3 or 4. Even if your VCR has Cable Tuning Ability (CTA), cable channels can only be received by connection to a Cable Service.

CABLE SYSTEMS

Cable system features and services vary in each local area. If you presently use your TV with a cable system, please read CABLE SYSTEMS INFORMATION on page 13 before making any connections.

> **"Note to CATV system installer:** This reminder is provided to call the CATV system installer's attention to Article 820–22 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical".

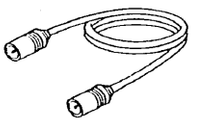
Rabbit ear antenna
Your VCR can be used with this type of antenna only if the picture is very clear and stable. When the antenna is part of the TV, the leads may not reach the VCR. You can either extend the leads, or obtain a movable rabbit ear antenna. We recommend using an outside antenna.

Note: If your TV has single antenna input (UHF/VHF), use figure A1.

Precautions
- Avoid extreme heat, cold, moisture, dust, magnetic fields, and strong vibrations.
- Protect the VCR from household pets.
- In areas with frequent electrical storms, lightning protection devices attached to the cable/antenna should be checked each year for good connections and condition. AC power line Surge Protection accessories are recommended for the VCR and TV. Such devices are commonly used for computer protection, and will minimize damage to the TV and VCR in the event of AC surge from lightning strike or other cause. Whenever possible, the TV and VCR should be unplugged from AC, and disconnected from the antenna/cable during electrical storms.

> **CAUTION:**
> Do not place the VCR by a window where it will be exposed to strong sunlight as it may malfunction.

ACCESSORY PROVIDED WITH VCR



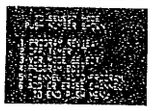
COAXIAL CABLE

CHANNEL TUNING

The automatic programming feature makes it easy and convenient to program the TV station into the tuner's memory.
Automatic programming is usually a "one-time" procedure, but you will need to repeat it if you move to a location that has different channels.
Note: The channels once you have preset will be held in memory of the VCR.

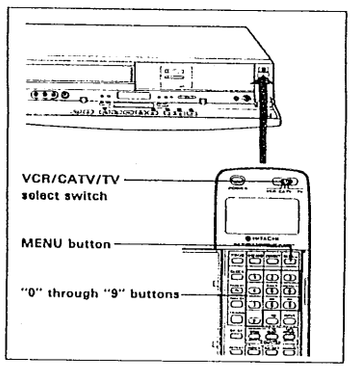
1. Turn on the power of both VCR and TV.
2. Be sure that the TV is set to the video channel (channel 3 or 4).
3. Aim the remote control unit at the receiver on the front panel of the VCR. Make sure that the VCR/CATV/TV select switch is set to "VCR".
4. Press the MENU button on the remote control unit. The "MENU", as illustrated, appears on the TV screen.

   NOTE: If the menu does not appear when the MENU button is pressed, press the VCR1 button and then press the MENU button.



5. Press button "3" for VCR function setting. The VCR function setting "MENU" appears on the TV screen.

6. Press button "4" to select "NORMAL", "CATV1" or "CATV2". If your VCR is connected to a home antenna system, select "NORMAL"; select "CATV1" when your VCR is connected to a cable antenna. Switching is performed between "NORMAL", "CATV1" and "CATV2" on the TV screen every time button "4" is pressed.
   NOTE: Usually select "CATV1" when your VCR is connected to a cable antenna. "CATV2" is to be selected in special cases.



7. Press the MENU button twice. The "MENU", as illustrated, will appear on the TV screen.

8. Press button "5".
   The tuner will automatically cycle through all available channels in the area and place them in the tuner's memory. It takes about 2 – 3 minutes. The channel number will stop changing when the tuner is finished cycling. Programming is now completed.
   You can select the active channels by pressing the CHANNEL select buttons.

■ Eliminating unwanted preset channels

You may want to have only a few favorite channels in the tuner's memory so you can select them more quickly with the CHANNEL select button.
Occasionally automatic programming may include a vacant channel in the tuner's memory if there happened to be some sort of "noise" or "stray signal" on the channel when the tuner was programmed. This procedure explains how to delete any unwanted channels from the tuner's memory.

1. Follow steps 1 through 4 of "Channel Tuning".

2. Press "6". The "menu", as illustrated, will appear on the TV screen.

3. Select the channel number by pressing buttons "0" through "9". (Press "0" and then "8" for channel 8.)
   Press the PLAY button to add channels and the STOP button to erase channels.
   Perform the same procedure to add or erase other channel numbers.
   NOTE: Erased channels cannot be selected by the CHANNEL button, but can be selected by buttons "0" through "9".

4. Press MENU button to return to the TV screen.

NOTE: There are some areas where channels cannot be switched when "CATV1" is selected. In this case, select "CATV2" as in step 6 on the previous page.

■ Adding channels to the tuner's memory

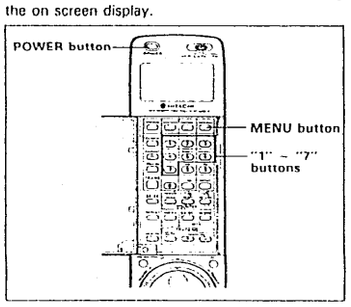
You may have deleted a channel from the tuner's memory and want to put it back. Occasionally automatic programming may "miss" an active channel because the signal is very weak or because the channel happened to be "off the air" when the tuner was programmed. Use this procedure to add any channel in the memory.

Your VCR is capable of receiving "off-the-air" TV channels (VHF 02 – 13, UHF 14 – 69) and CATV channels 01 – 125, a total of 181 channels*.

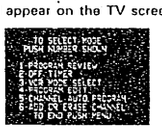
* You can receive channels 02 – 13 on both "off-the-air" and "cable" channels. Therefore, the total number of channels including "off-the-air" and "cable" channels is 181 channels (12 + 56 + 125 – 12 = 181).

VCR FUNCTION SETTING

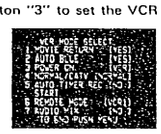
You can change the VCR mode as required using the on screen display.



1. Turn on the power of both the VCR and TV.
2. Be sure that the TV is set to the video channel (3 or 4).
3. Point the remote control unit at the receiver on the front panel of the VCR.
4. Press the MENU button. The "menu", as illustrated, will appear on the TV screen.



5. Press button "3" to set the VCR function.



   - The VCR function set menu will appear. Press buttons "1" through "7" to select the required function.

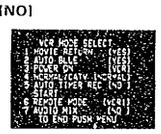
■ MOVIE RETURN [YES] or [NO]

Press "1" → to change

[YES]: When a cassette (with erase prevention tab removed) is loaded, playback starts automatically. When the tape reaches the end, it will stop automatically and will rewind to its start. Then the cassette will be ejected automatically.
Note: This function also rewinds the tape automatically when it detects a non-recorded section lasting about 30 seconds or more.
[NO]: This function does not operate.

■ AUTO BLUE [YES] or [NO]

Press "2" → to change



[YES]: The TV screen becomes blue when a channel which is not transmitting a signal is selected. The TV screen also becomes blue when a tape without recording is played back.
[NO]: The TV screen does not become blue.

■ POWER ON [VCR] or [TV]

Press "3" → to change

[VCR]: The VCR/TV select button is set to "VCR" mode when the VCR power is turned on.
[TV]: The VCR/TV select button is set to "TV" mode.

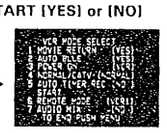
■ NORMAL/CATV SELECTION

Press "4" → to change

[CATV1]: Select [CATV1] if TV and VCR are connected to a cable antenna.
[CATV2]: There are some areas where channels cannot be switched when [CATV1] is selected. In this case, select [CATV2].
[NORMAL]: Select [NORMAL] if TV and VCR are not connected to a cable antenna.

■ AUTO TIMER REC START [YES] or [NO]

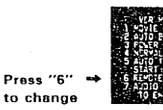
Press "5" → to change



[YES]: Sounds an alarm when the VCR power is turned on 5 minutes before a timer recording will start. When the VCR is in the stop mode at this time, the VCR power is turned off automatically.
[NO]: The above function does not operate.

■ REMOTE MODE [VCR1] or [VCR2]

Press "6" → to change

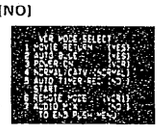


[VCR 1]: Normally select this [VCR1].
[VCR 2]: Select [VCR2] when you are using another Hitachi VCR and operate the two VCRs using the remote control unit provided with this VCR.

Note: After you have selected [VCR2], press the VCR2 button and then perform the following operations; otherwise, the VCR does not accept commands. To return to [VCR1] after you have selected [VCR2], press the VCR2 button first.

■ AUDIO MIX [YES] or [NO]

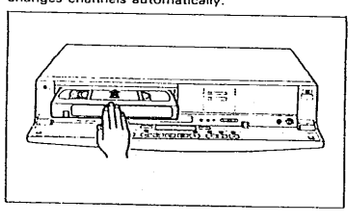
Press "7" → to change



[YES]: When different sounds are recorded on the Hi-Fi and linear tracks, select [YES] to hear both sounds at the same time.
[NO]: Normally select [NO].

TIMER RECORDING

The programmable electronic clock/timer permits the unattended recording of up to 8 preselected programs, including one program on the same day of each week or one program at the same time every day. It can be preset up to 1 year in advance to record your favorite programs. It turns the unit on and off and changes channels automatically.



1. Insert the Cassette.
2. Set the program timer.
   "START (ON) TIME", "STOP (OFF) TIME", "DAY" etc. See below.
3. Turn power off. Now recording will begin automatically at the start time.

Notes:
- It is not necessary to press RECORD button.
- The "TAPE" flashes to warn that recording will not occur because cassette has not been inserted.
  If the safety tab on the cassette has been removed, the VCR will automatically eject the cassette when placed in the timer mode.

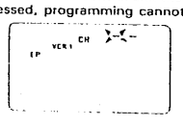
■ Programming the timer for unattended recording

For unattended recording the timer needs to know what day to make the recording, the time to start, the time to stop, and the channel to be recorded.

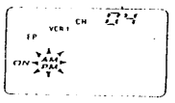
Things to know before starting

- VCR and TV may be on or off for programming the timer.
- You can correct an error in the program any time before the last step by pressing CORRECT button repeatedly until the digit to be corrected becomes flashing and then enter the correct digit.
- A one minute halt in programming will cause all programmed steps to be erased. Start from the beginning and reprogram.
- VCR/CATV/TV select switch must be set to "VCR" for programming the timer.

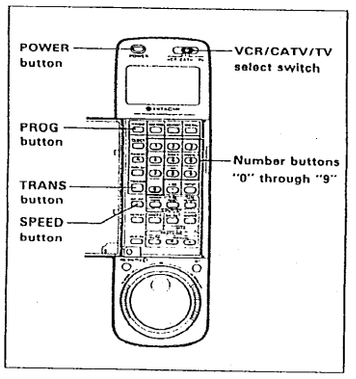
1. Press PROG button once.
   Note: If, when the present time is not being displayed on the remote control unit the PROG button is pressed, programming cannot be done.



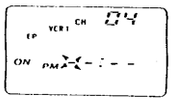
2. Press two digits for the channel to be recorded (for example, "0", "4" for channel 4).



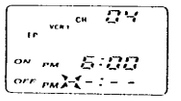
   Note: For single-digit channel numbers, first press "0" and then the channel number "1" through "9".



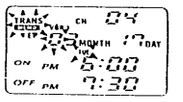
3. Press "8" for AM or "9" for PM.



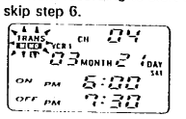
4. Press four digits, two for the hour and two more for a minute (for example, "0", "6", "0", "0" for 6:00).



5. Press four digits, two for the hour and two more for the minute (for example, "0", "7", "3", "0" for 7:30).



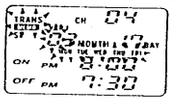
6. If you want to start recording on a future date, press four digits (two for the month and two for the day) (for example "0", "3", "2", "1" for begin recording on March 21). The day of the week is displayed automatically.
   Note: If you want recording to start on the current day, skip step 6.



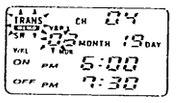
7. Press SPEED button to select SP, EP or AUTO modes. Selecting AUTO enables automatic recording.

8. Aim the remote control unit at the receiver on the front panel of the VCR and press the TRANS button.
   Note: If the TV is turned on, the programmed information will be displayed on the TV screen for several seconds.
9. Turn off the power of the VCR.
   Now the VCR will begin recording at the time you selected.

- **To record at the same time Monday through Friday**
  Press button "5" (DAILY) after setting the stop time in step 5. The "MON ~ FRI" will be displayed. Then follow steps 7 through 9.



- **To record on a specified day at the same time each week**
  After setting the stop time in step 5, press button "6" (WEEKLY) repeatedly to set the day of the week and then program the start date. The figure below shows that Monday in each week has been selected.



Notes:
1. The information in the display of the remote control unit goes off automatically after approx. one minute.
2. When the TRANS button is pressed in step 8, the "ERROR" indicator appears in the VCR display in the following case.
   - When the TRANS button is pressed with the remote control unit incorrectly pointing at the remote control receiver of the VCR.

   Input information correctly again in the above case.
3. When all program numbers 1 to 8 are programmed, "FULL" is displayed and programming is not performed even when the program information is transmitted to the VCR.
4. If you select the "AUTO" mode using the SPEED button, the "AUTO" mode automatically determines how much tape is left and switches speed accordingly. The "AUTO" mode starts recording at SP speed, but if it finds out there is not enough tape left to complete the programmed recording, it switches over to EP speed.
   - There will be some distortion in picture and sound at the point where speed is switched.
5. If one programmed event does not finish before another programmed event starts, the VCR finishes recording the first event and then begins recording the other event that is already in progress.

6. To stop the VCR during timer recording, press POWER button and then STOP button within 10 seconds.

7. If a power failure of more than 30 minutes occurs, "– – : – –" appears in the display and the time and programs will be erased. Now set the clock and program the timer.
8. If you select the "AUTO TIMER REC START [YES]" on page 23, an alarm sounds when the VCR power is still on 5 minutes before a timer recording will start. If the VCR is in the stop mode at this time, the VCR power is turned off automatically.

RECALLING THE PROGRAM

1. Turn on the power of both VCR and TV.
2. Be sure that the TV is set to the video channel (channel 3 or 4).
3. Aim the remote control unit at the receiver on the front panel of the VCR.
4. Press MENU button on the remote control unit.

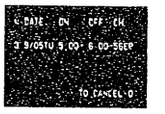
5. Press "1" button.
   The TV screen displays the information you entered the program for 1 minute.

6. Press MENU button to return to TV screen.

CLEARING (ERASING) INFORMATION FROM A PROGRAM

1. Follow steps 1 through 5 of "Recalling the Program".
   The programmed information appears on TV screen.

2. Press the button (1 through 8) of the program you want to clear.



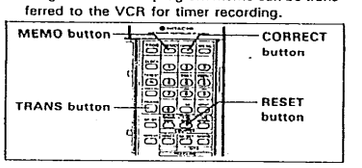
3. Press button "0".

   That erases the program. To clear another program, repeat steps 2 and 3.
4. When finished, press MENU button.

Note: Normal program is cleared automatically when the timer recording is finished, but daily and weekly programs remain in the timer even after the timer recording is finished.

PROGRAM MEMO

- The VCR stores events programmed and sent to it from the remote control, but the remote control can also store up to eight programmed events (using program memo).
- Dates are automatically updated unless the program is erased. (See below.)
- Programs stored in program memo can be transferred to the VCR for timer recording.



To store a program
When MEMO flashes on and off during the programming of a timer recording, press the MEMO button.
- The program is stored in the remote control.

To transfer the program stored in PROGRAM MEMO to the VCR
1. Press MEMO button.
   - Press the button until the program you want to make timer recording is displayed.
2. Press TRANS button.
   - Point remote control at VCR and press TRANS button.
   - Don't forget to turn VCR power off. Otherwise, the timer recording will not start.

During event storage
If eight events are already in storage, MEMO will not flash on and off during the programming of a timer recording. When MEMO button is pressed, the "FUL" is displayed to show that storage is full.

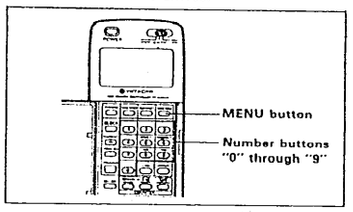
To clear storage
Press MEMO button to display the contents stored, then press RESET button.

When programmed recording time ends
Dates in the MEMO are automatically advanced. For example, after an event programmed to be recorded on one day is over, the VCR automatically updates that event for recording at the same time the following week.

Checking and reprogramming
Every press of MEMO button shows the contents of storage on the remote control are displayed. To reprogram storage contents, press CORRECT button and revise.

OFF TIMER

OFF TIMER permits to turn off the VCR power automatically. Setting OFF TIMER to a time no more than 99 minutes from now automatically cuts power when that time arrives.



1. Press MENU button.
   The menu, as illustrated, appears on the TV screen.

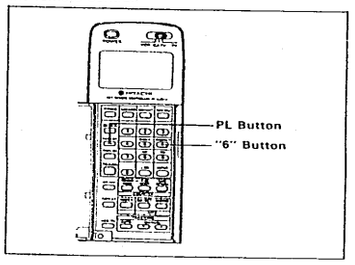
2. Press "2" button.
   OFF TIMER appears on the TV screen.

3. Set OFF TIMER by pressing buttons "0" through "9".
   To turn VCR power off in 50 minutes, for example, first press "5", then press "0".

4. Press MENU button.
   SLEEP appears on the VCR's display and 50 minutes later power goes off.

PARENT LOCK BUTTON

When this button and button "6" are pressed simultaneously, the buttons on the front panel of the VCR cannot be operated. This prevents children from operating the VCR without their parents approval.
To release the lock, press the PL button and button "6" simultaneously or press the POWER button of the remote control.



HOW TO OPERATE YOUR TV OR CABLE CONVERTER BY USING THE REMOTE CONTROL UNIT

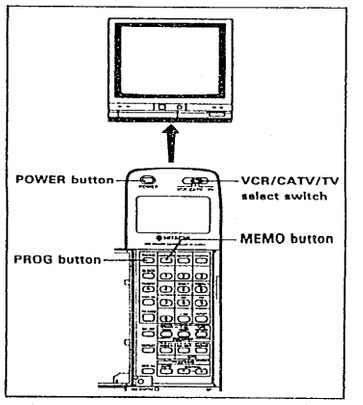
This remote control unit is designed to operate 14 different types of TV's and 8 different types of cable converters. You must first program the remote control unit to match the remote system in your TV or cable converter.

Programming the remote control for TV set

1. Install the batteries in the remote control unit.
2. Turn on your TV.
3. Set the VCR/CATV/TV select switch to TV. Then press PROG button. "CODE 01" appears on the remote control display.
4. Point the remote control toward your TV.
5. Press POWER button on the remote control. If remote control can turn the TV's power on and off, then it can operate the TV.
6. If the remote control cannot turn power on off, press MEMO button again to display "CODE 02". Then press POWER button. If that doesn't work, repeat the process trying "CODE 03", "CODE 04", and so on to "CODE 14".

Programming the Remote Control for Cable Converter

1. Install the batteries in the remote control unit.
2. Turn on your Cable Converter.
3. Set the VCR/CATV/TV select switch to CATV. Then press PROG button "CODE 01" appears on the remote control display.
4. Point the remote control toward your Cable Converter.
5. Press POWER button on the remote control. If remote control can turn the Cable Converter's power on and off, then it can operate the Cable Converter.
6. If the remote control can not turn power on and off, press MEMO button again to display "CODE 02". Then press POWER button. If that doesn't work repeat the process trying "CODE 03" "CODE 04", and so on to "CODE 08".



Notes:

- If your TV or Cable Converter does not respond to any of the above procedures, the TV or Cable Converter cannot be controlled by this remote control unit.
- You will only have to program your remote control to match your TV or Cable Converter once. It will remember what codes matchs your TV or Cable Converter until you replace the batteries.
- Whenever you install or replace batteries in the remote control, you must program the remote control to match the remote system in your TV or Cable Converter.
- When operating the TV or Cable Converter, first set the VCR/CATV/TV select switch to "TV" or "CATV", and then press the button which corresponds to the TV or Cable Converter function you want.

- When you want to operate the VCR with this remote control after operating the TV or Cable Converter, first set the VCR/CATV/TV select switch to VCR and then press the button which corresponds to the VCR function you want.

Types of TV / Buttons on remote control	No. 1 Hitachi	No. 2 RCA	No. 3 Zenith	No. 4 Sony	No. 5 Magnabox	No. 6 Sanyo	No. 7 Gold Star 1	No. 8 Toshiba	No. 9 Gold Star 2	No. 10 NEC	No. 11 Panasonic
POWER	POWER	POWER	POWER	POWER	POWER	POWER	POWER	POWER	POWER	POWER	POWER
1	1	1	1	1	1	1	1	1	A	1	1
2	2	2	2	2	2	2	2	2	B	2	2
3	3	3	3	3	3	3	3	3	C	3	3
4	4	4	4	4	4	4	4	4	D	4	4
5	5	5	5	5	5	5	5	5	E	5	5
6	6	6	6	6	6	6	6	6	F	6	6
7	7	7	7	7	7	7	7	7	G	7	7
8	8	8	8	8	8	8	8	8	H	8	8
9	9	9	9	9	9	9	9	9	I	9	9
0	0	0	0	0	0	0	0	0	K	0	0
CHANNEL ▲	CHANNEL ▲	CHANNEL ▲	CHANNEL ▲	CHANNEL ▲	CHANNEL ▲	CHANNEL ▲	CHANNEL ▲	CHANNEL ▲	L	CHANNEL ▲	CHANNEL ▲
CHANNEL ▼	CHANNEL ▼	CHANNEL ▼	CHANNEL ▼	CHANNEL ▼	CHANNEL ▼	CHANNEL ▼	CHANNEL ▼	CHANNEL ▼	J	CHANNEL ▼	CHANNEL ▼
AUDIO LEVEL ▲	VOLUME ▲	VOLUME ▲	VOLUME ▲	VOLUME ▲	VOLUME ▲	VOLUME ▲	VOLUME ▲	VOLUME ▲	VOLUME ▲	VOLUME ▲	VOLUME ▲
AUDIO LEVEL ▼	VOLUME ▼	VOLUME ▼	VOLUME ▼	VOLUME ▼	VOLUME ▼	VOLUME ▼	VOLUME ▼	VOLUME ▼	VOLUME ▼	VOLUME ▼	VOLUME ▼
MUTE	MUTE	MUTE	MUTE	MUTE	MUTE	MUTE	MUTE	MUTE	MUTE	MUTE	MUTE
DISPLAY	DISPLAY	DISPLAY	—	DISPLAY	DISPLAY	—	—	—	—	—	RECALL
100	100	100	ENTER	ENTER	100	100	—	100	—	—	—
PREV CH	PREV CH	PREV CH	PREV CH	—	PREV CH	—	—	—	—	PREV CH	PREV CH
INPUT	AVX	–	–	–	–	–	–	–	–	–	–

Types of TV / Buttons on remote control	No. 12 Mitsubishi	No. 13 JVC	No. 14 Sharp
POWER	POWER	POWER	POWER
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
0	0	0	0
CHANNEL ▲	CHANNEL ▲	CHANNEL ▲	CHANNEL ▲
CHANNEL ▼	CHANNEL ▼	CHANNEL ▼	CHANNEL ▼
VOLUME ▲	VOLUME ▲	VOLUME ▲	VOLUME ▲
VOLUME ▼	VOLUME ▼	VOLUME ▼	VOLUME ▼
MUTE	MUTE	MUTE	MUTE
DISPLAY	DISPLAY	—	
—	MENU	—	
PREV CH	PREV CH	PREV CH	
—	—	—	

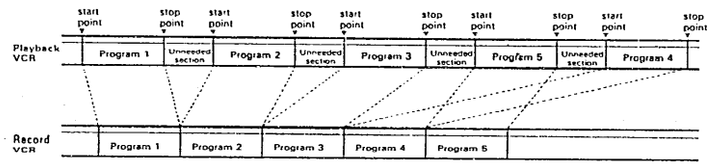
Types of Cable Converter / Buttons on remote control	No. 1 Jerrold 1	No. 2 Jerrold 2	No. 3 Jerrold 3	No. 4 Hamlin	No. 5 Zenith	No. 6 Scientific Atlanta	No. 7 Pioneer	No. 8 Philips
POWER	POWER	POWER	POWER	POWER	POWER	POWER	POWER	POWER
1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9
0	0	0	0	0	0	0	0	0
CHANNEL ▲	CHANNEL ▲	CHANNEL ▲	CHANNEL ▲	CHANNEL ▲	CHANNEL ▲	CHANNEL ▲	CHANNEL ▲	CHANNEL ▲
CHANNEL ▼	CHANNEL ▼	CHANNEL ▼	CHANNEL ▼	CHANNEL ▼	CHANNEL ▼	CHANNEL ▼	CHANNEL ▼	CHANNEL ▼
100	–	–	ENT	–	ENT	ENT	ENT	ENT
AUDIO LEVEL ▲	–	–	–	–	–	–	–	VOL ▲
AUDIO LEVEL ▼	–	–	–	–	–	–	–	VOL ▼
MUTE	–	–	–	–	–	–	–	MUTE

IMPORTANT NOTICE:

While Hitachi's remote control unit is compatible with most television sets or Cable Converters, it is possible that the remote control unit will not work with your TV set or Cable Converter.

PROGRAM SYNCHRO EDIT

If the part to be edited has been programmed, the playback VCR automatically controls the record VCR for editing.



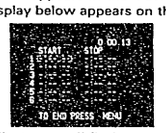
Preparations

- Connect playback VCR (this VCR) to record VCR and TV.
- Prepare the playback VCR (this VCR) as follows.
  - Insert recorded cassette.
  - Set the VIDEO select switch to SHARP.
  - Set mode display to OFF.
  - Play tape a little to adjust tracking.
- Prepare the record VCR as follows.
  - Insert a cassette with record prevention tab in place.
  - Press the INPUT select button to select the external input (LINE).
- Turn TV power on. Select channel for VCR use.

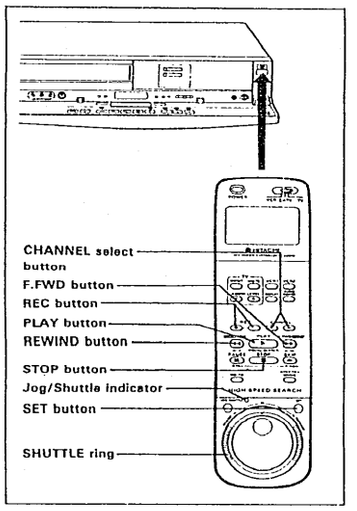
Operations

1. Aim the remote control at the receiver on the front panel of the VCR.
2. Press MENU button
   The menu, as illustrated, appears on the TV screen.

3. Press "4" button
   - "ASSEM" appears in the VCR display.
   - The display below appears on the TV screen.



   The first "—:——.—" flashes prompting you to select the start of the first program segment you want to copy.



4. Locate the beginning of the first segment you want to copy with the SHUTTLE ring or PLAY, REWIND, F.FWD button.
   Note: If you use the SHUTTLE ring, make sure that the jog/shuttle indicator on the remote control lights up.
5. After you have located the beginning of the program segment you want to copy, press the SET button on the remote control. The first "—:——.—" is replaced with the current time counter reading, and the flashing cursor moves to the first STOP "—:——.—" position.
6. Locate the point where you want to stop copying the first segment by using the SHUTTLE ring or PLAY, REWIND, and F.FWD buttons, and then press the SET button on the remote control. The programming for the first segment has been completed.
7. Repeat steps 4 through 6 for each program segment (up to six) you want to copy.
   Note: To correct an error while programming, press the CHANNEL up or down button on the VT-F551A or VT-F551A's remote control to move the cursor to the incorrect counter reading. (Press CHANNEL up for forward or CHANNEL down for backward.) Then press the RESET/T-160 button. The counter reading will be reset to "—:——.—. Enter the correct counter reading by repeating the above steps.
8. Press the CHANNEL up button repeatedly to remove the flashing cursor from the TV screen.
9. Press the RECORD button, then the PAUSE button to place the recording VCR in the record-pause mode.
10. Press the PLAY button on the VT-F551A or VT-F551A's remote control. The program menu will disappear from the screen, and the VCR will automatically search for the beginning of the first programmed segment and start copying.
    Note: PUSH PLAY TO START must be displayed on the TV screen when you press the PLAY button for the coying to begin.

When programmable synchro edit is finished, the VT-F551A will enter the stop mode and the other VCR will enter the record-pause mode. Press the STOP button on the recording VCR to release the record-pause mode and place it in the stop mode. Then press the MENU button on the VT-F551A's remote control to remove the PROGRAM EDIT menu from the TV screen.

Notes:

- If the MENU button is pressed prior to pressing the STOP button on the recording VCR, the recording VCR will enter the record mode.
- The programmed information will clear automatically when the cassette is ejected or the VCR's power is turned off.

DISASSEMBLY

1. NAMES AND LOCATIONS OF CIRCUIT BOARDS

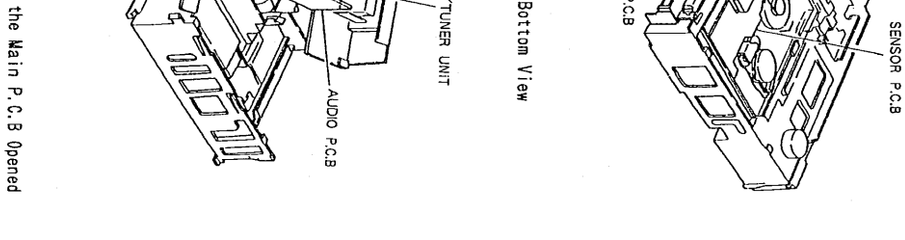


Fig. 1-1 Top View

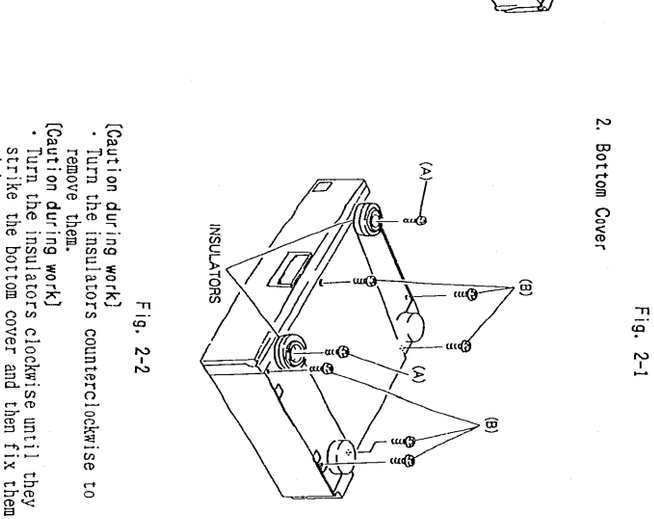


Fig. 1-2 Bottom View

Fig. 1-3 State with the Main P.C.B Opened

[Procedure when removing]
Remove the components in the order of letters (A, B, C ···) in the illustrations.
[Procedure when reinstalling]
Reinstall the components by the reverse procedure to removal when not otherwise specified.

2. CASE REMOVAL

1. Top Cover

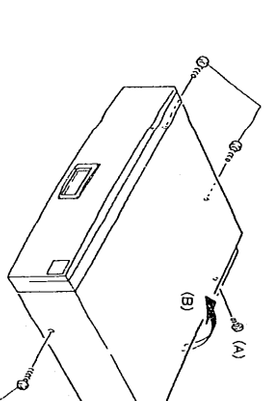


Fig. 2-1

2. Bottom Cover

Fig. 2-2

[Caution during work]
· Turn the insulators counterclockwise to remove them.
[Caution during work]
· Turn the insulators clockwise until they strike the bottom cover and then fix them with screws.

3. Front Panel

* Components to remove previously
  1) Top Cover (Item 2-1)
  2) Bottom Cover (Item 2-2)

[Caution during work]
- The circuit board in the front panel and the circuit boards in the chassis are connected by connectors. Remove the front panel by pulling it perpendicularly from the chassis.

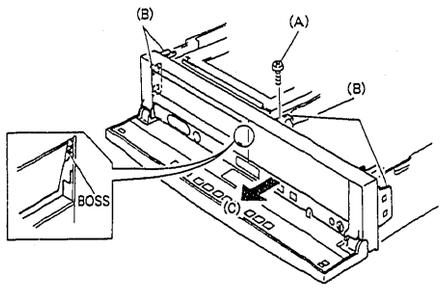


Fig. 2-3

[Caution when reinstalling]
- Reinstall the front panel while the cassette door is pushed in halfway, so that the boss of door actuating arm can be positively engaged with the recess on the side of the door as shown below.
- Reinstall the front panel perpendicularly to the chassis while being careful with the connectors (which connect the circuit boards).

4. Front Door/Door Dumper

* Components to remove previously
  1) Top Cover (Item 2-1)
  2) Bottom Cover (Item 2-2)
  3) Front Panel (Item 2-3)

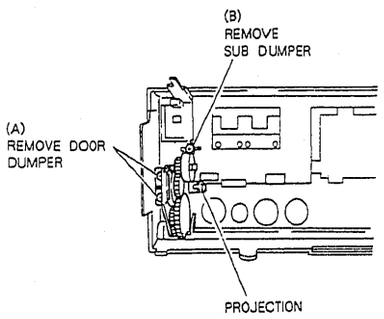


Fig. 2-4 (a)

[Caution during work]
- Open the front door and remove the door damper. The front door can be removed easily.

[Caution when reinstalling]
- Install the sub-damper with its projection at the bottom.

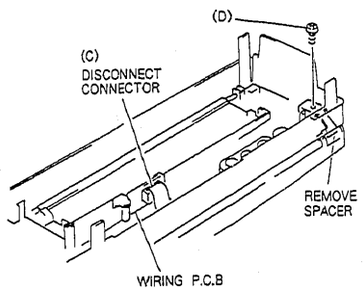


Fig.2-4 (b)

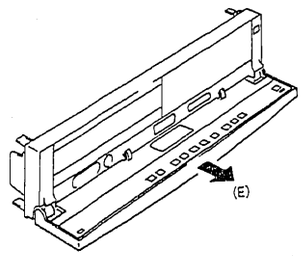


Fig. 2-4 (c)

[Caution duling work]
- Be careful not to scratch the front panel.

[Caution when reinstalling]
- Pass the flexible connector through the hole in the bottom at the middle of the front panel.
- open the front door when installing the door damper and fixing bracket.

5. Front Panel Cover

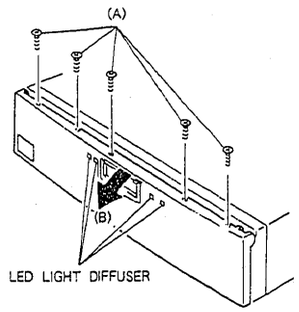


Fig. 2-5

[Caution when reinstalling]
- Check that the LED light diffuser is installed securely.

6. Cassette Door

* Components to remove previously
  1) Front Panel (Item 2-3)

[Caution when reinstalling]
- Attach the spring at the right of the cassette door firmly.

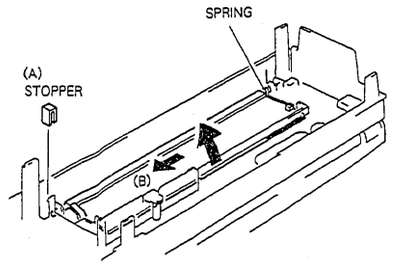


Fig. 2-6

Be sure to remove the cases when servicing and checking the circuit boards. - Top Cover (see item 2-1) - Bottom Cover (see item 2-2) - Front Panel (see item 2-3)

3. CIRCUIT BOARD REMOVAL

1. Wiring Circuit Board

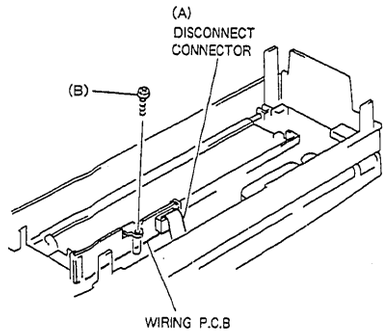


Fig. 3-1

2. Front Jack Circuit Board

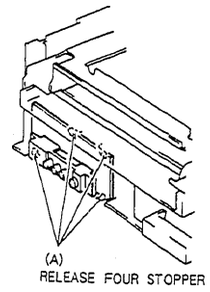


Fig. 3-2

3. Timer Circuit Board

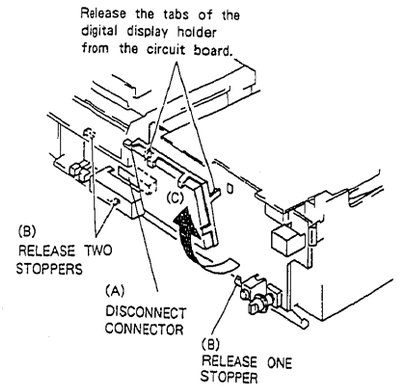


Fig. 3-3

〈How to disconnect connectors between circuit boards〉
- Connectors between timer and main circuit boards:
  1) Open the timer circuit board to set it in the horizontal position.
  2) Make the timer circuit board parallel with the main circuit board and pull out the timer circuit board in the direction of arrow (A).

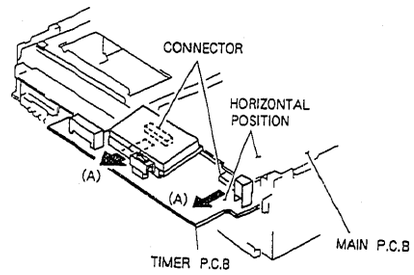


Fig. 3-4 How to disconnect connectors

4. Main Circuit Board
* Components to remove previously
1) Open the timer circuit board. (See item 3-3)

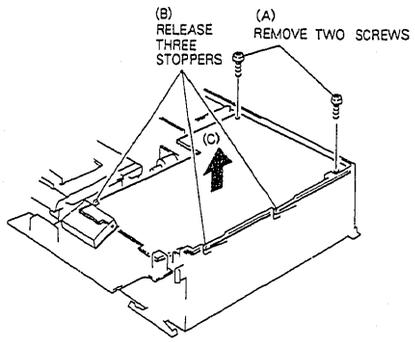


Fig. 3-5

〈Rear Panel Removal〉
· While lifting the main circuit board, remove two (2) screws on the rear panel and one (1) nylon rivet on the circuit board, and pull out the rear panel backwards.

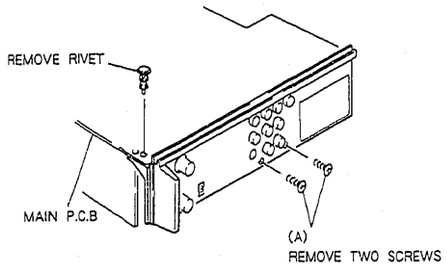


Fig. 3-6 Rear Panel Removal

5. Luminance/Chroma ,Audio Circuit Baord
* Components to remove previously
1) Remove the main circuit board. (See item 3-4)
〔Caution during work〕
1) Unsolder the connectors from the solder side of the main circuit board and then remove the circuit board.

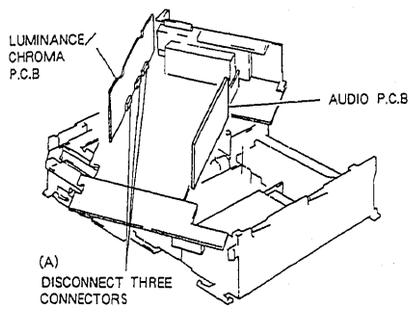


Fig. 3-7

6. Power Supply Circuit Board, Regulator Circuit Boards
* Components to remove previously
1) Remove the rear piece first.

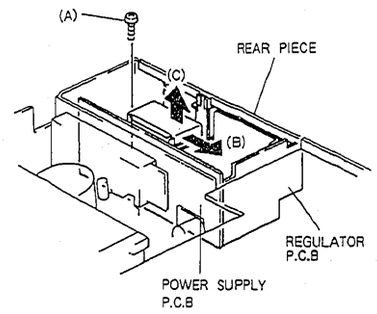


Fig. 3-8

7. Pre-Amp/Head SW Circuit Board

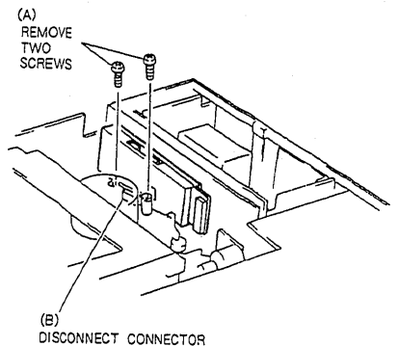


Fig. 3-9

8. Sensor Circuit Board
* Components to remove previously
1) Remove the take-up pulley. (See item 6-13)

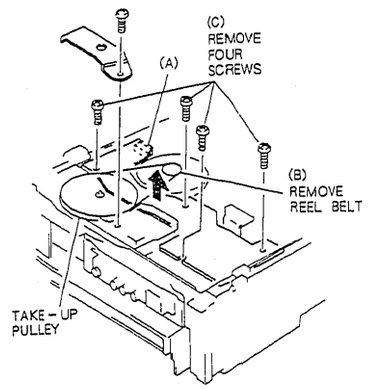
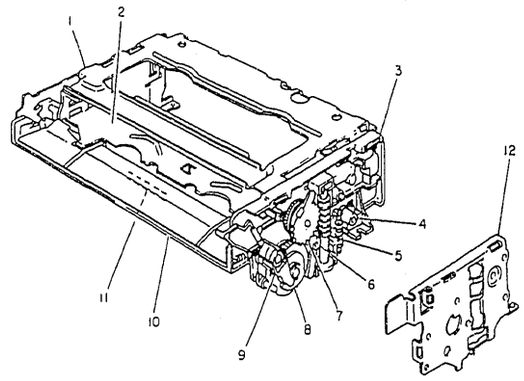


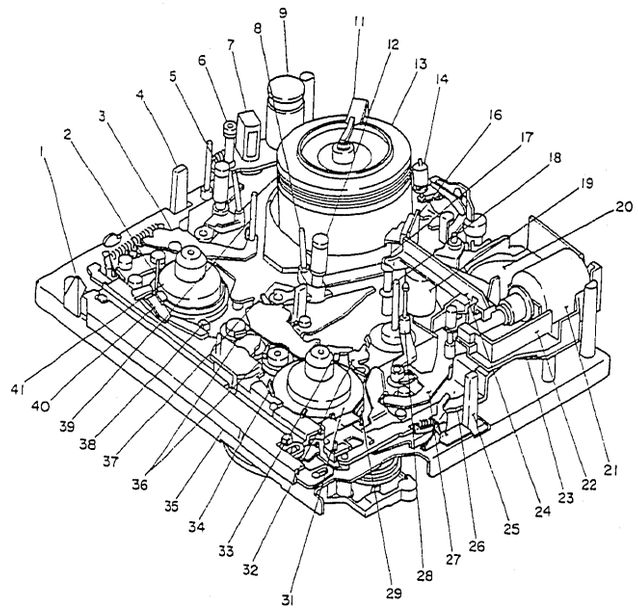
Fig. 3-10

4. IDENTIFICATIONS AND LOCATIONS OF MAIN MECHANICAL COMPONENTS



1. Chassis Holder
2. Cassette Holder
3. Gear Bracket
4. Switch Lever (B)
5. FL Worm Gear
6. Switch Lever (A)
7. Worm Wheel
8. Drive Gear
9. Door Arm
10. Front Holder
11. Shaft Pin
12. Side Chassis

Fig. 4-1 Cassette Loading Mechanism



1. Safety Arm
2. Tension Band
3. Tension Arm
4. Supply End Sensor
5. Supply Guide Roller
6. Supply Guide Pole
7. Full Erase (FE) Head
8. Inclined Guides
9. Impedance Roller
10. ———
11. Ground Brush
12. Take-up Guide Roller
13. Cylinder (Video Heads)
14. Auto Head Cleaning Mechanism
15. ———
16. Audio/Control (A/C) Head
17. Take-up Guide Pole
18. Capstan Shaft
19. Pressure Roller
20. Mechanism State Switch
21. Loading Motor
22. Loading Motor Holder
23. Load Bracket Assembly
24. Cassette Lid Opener
25. Take-up End Sensor
26. Brake Link Arm
27. Pressure Roller Operation Arm
28. Drawer Pin
29. Take-up Sub Brake
30. ———
31. Take-up Reel Disk
32. Reverse Slow Brake
33. Slow Brake
34. Take-up Main Brake
35. Slider Block
36. Idler Brake
37. End Lamp
38. Supply Main Brake
39. Tension Pole
40. Supply Sub Brake
41. Supply Reel Disk

Fig. 4-2 Top View of Mechanism

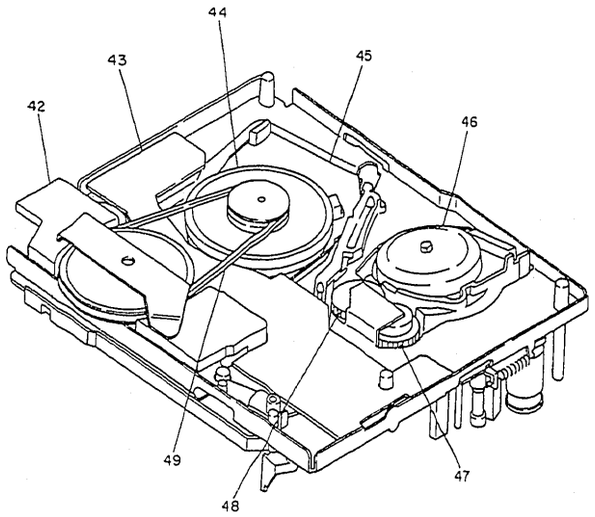


Fig. 4-3 Bottom View of Mechanism

42. Clutch Gear Assembly
43. Sensor P.C.B
44. Capstan Motor
45. Capstan Motor P.C.B
46. Cylinder Motor
47. Supply Loading Gear
48. Take-up Loading Gear
49. Reel Belt

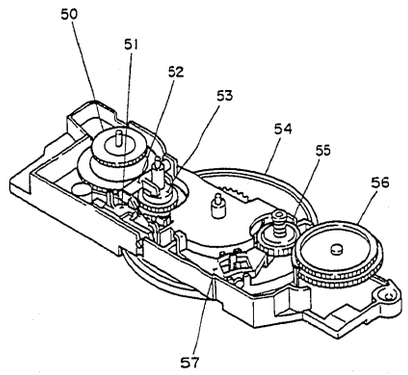


Fig. 4-4 Clutch Gear Assembly

50. Take-up Gear
51. Clutch Arm
52. Change Arm
53. Change Gear
54. Take-up Pulley
55. FL Change Gear
56. Relay Gear
57. FL Change Arm

Be sure to remove cases, etc. before servicing the mechanism and replacing components, otherwise, the cases, etc. could be damaged.
[Procedure of disassembly]
Remove the parts in the order of letters shown in the illustrations.
[Procedure of reinstallation]
Reinstall the parts by the reverse procedure to removal when no special cautions are given.

5. CASSETTE LOADING MECHANISM REMOVAL

1. Cassette Loading Mechanism

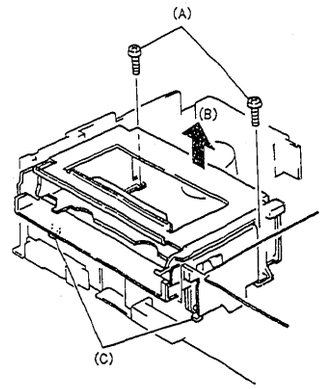


Fig. 5-1

2. Loading Gear Assembly, Chassis Holder, Cassette Holder Assembly and Front Holder

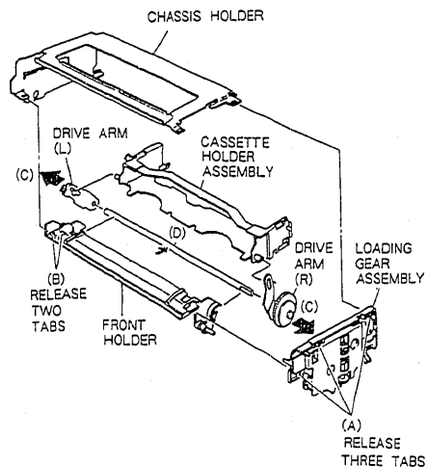


Fig. 5-2

[Cautions when reinstalling]
1) Check the insertions of 4 bosses.
2) Check the alignment markings.
3) Check the position of cassette switch lever (A).

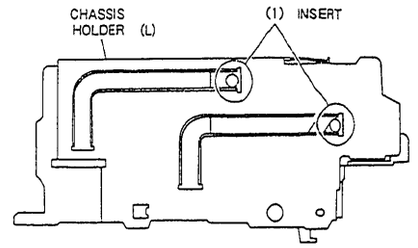


Fig. 5-3

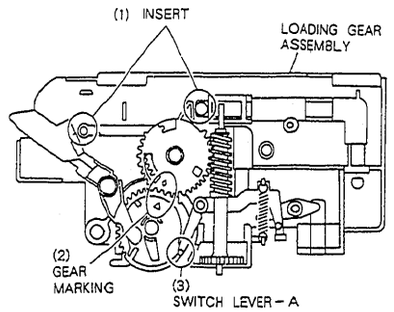


Fig. 5-4

3. Cassette Holder Base and Cassette Holders (L/R)

(B) RELEASE TAB

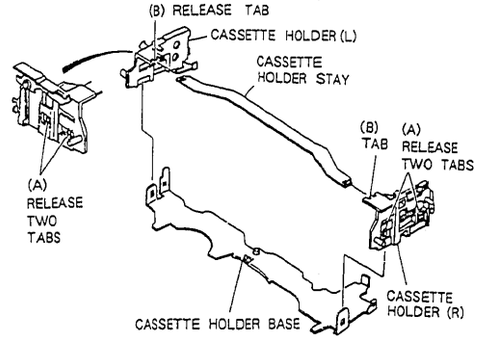


Fig. 5-5

4. Gear Bracket, FL Worm Gear, Door Arm, Worm Wheel and Switch Levers A/B

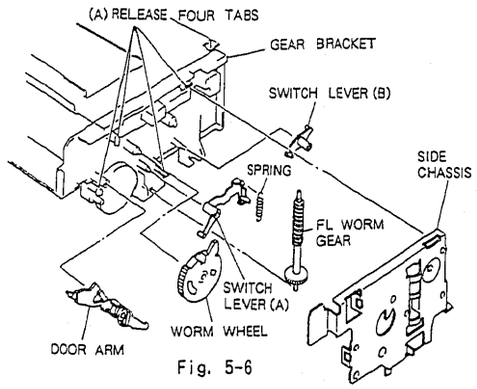


Fig. 5-6

6. MAIN MECHANICAL COMPONENTS REMOVAL

1. FE (Full Erase) Head /Impedance Roller and A/C (Audio/Control) Haed

〔Cautions when reinstalling〕
1) Hook the bottom of the spring under the head base to the chassis and the top to the stopper of the head base.

〔Adjustments after reinstalling〕
1) A/C (Audio/Control) Head Adjustment
2) X-Value Adjustment
3) Guide Pole Height Adjustment
4) Audio Bias Level Adjustment

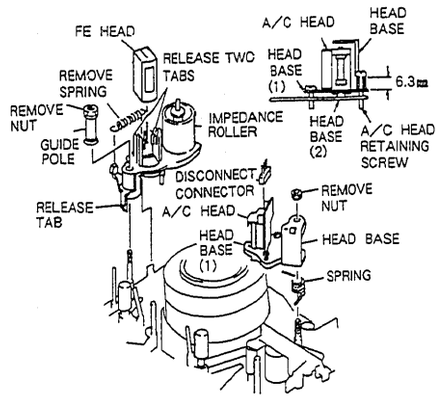


Fig. 6-1

2. Cylinder Motor Assembly

〔Cautions during work〕
1) Place the side of the unit down for working.
2) Do not touch video head tips.

〔Adjustment after reinstalling〕
1) Adjustment after replacing the cylinder (video heads).

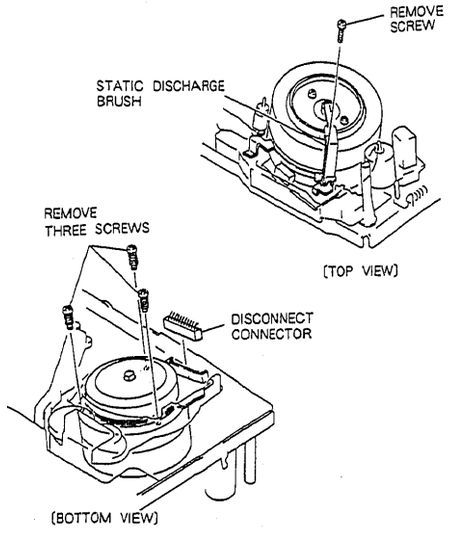


Fig. 6-2

3. Head Cleaning Arm Assembly, Head Cleaning Bracket Assembly

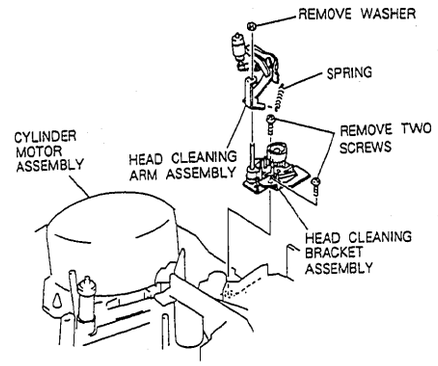


Fig. 6-3

4. Capstan Motor Assembly

〔Caution when reinstalling〕
1) Keep the capstan shaft clean.

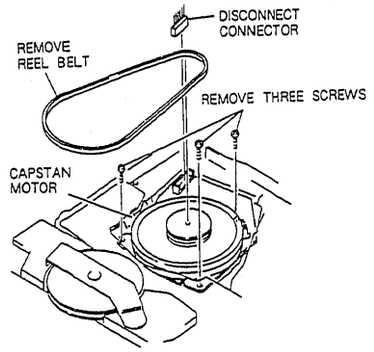


Fig. 6-4

5. Loading Motor/Mechanism State Switch Assembly

〔Caution during work〕
1) Release the 2 bosses of the motor holder from the screw holes in the motor when releasing 4 tabs.

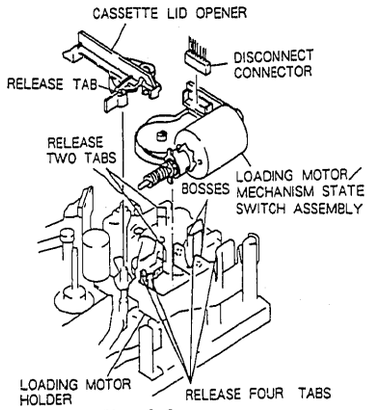


Fig. 6-5

6. Tension Arm/Tension Band

〔Caution during work〕
1) Move the supply subbrake in the direction of arrow (A) when removing the tension band.

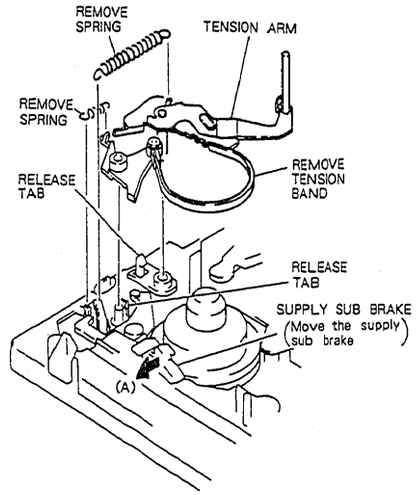


Fig. 6-6

7. Slider Block and Reel Drive Idler

* Components to remove previously
1) Remove the Gear bracket. (See item 6-8)

〔Caution when reinstalling〕
1) Push the supply subbrake and take-up main brake in the direction of arrows (A) when reinstalling them.
2) Check that 2 bosses of the load bracket assembly are inserted.

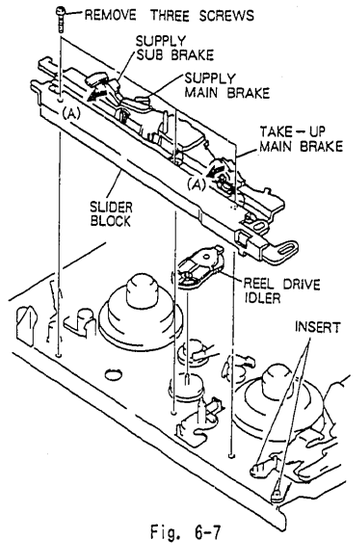


Fig. 6-7

8. Supply/Take-up Reel Disks, Slow and Reverse Slow Brakes, Supply and Take-up Idler Brakes, Supply and Take-up Gears, Safety Arm

* Components to remove previously
1) Slider Block (Item 6-7)
2) Tension Arm/Tension Band (Item 6-6)

〔Caution during work〕
1) Move the take-up tension brake in the direction of the arrow when removing the take-up reel disk.

〔Caution when reinstalling〕
1) Be sure to install a washer on the installation shaft.

〔Adjustments after installing〕
1) Tension Pole Position and Tension Adjustments
2) Reel Disk Height Adjustment

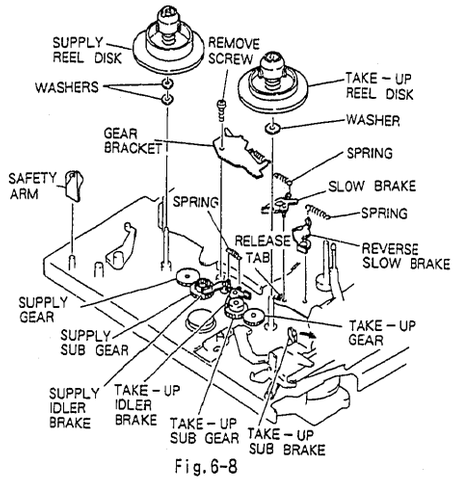


Fig. 6-8

9. Pressure Roller Assembly, Supply/Take-up Guide Poles and Supply/Take-up Guide Rollers

〔Cautions when reinstalling〕
1) Insert the pin of the pressure roller into the hole in the pressure roller operation arm.
2) Keep the surface of the pressure roller and guide pole which is in contact with the tape clean.

〔Adjustment after reinstalling〕
1) Guide Pole Height Adjustment
2) Guide Roller Height Adjustment

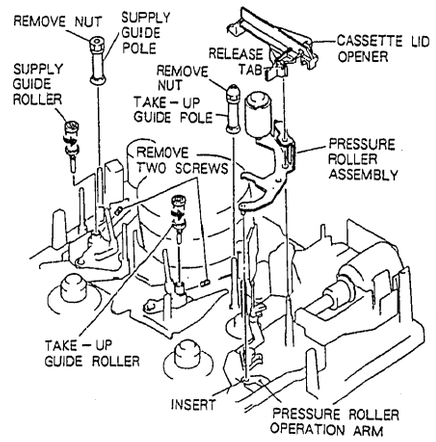


Fig. 6-9

10. Loading Motor Block, Brake Link Arm, FS Brake Arm and Latch Arm

[Caution when reinstalling]
1) Check that the boss is inserted into the hole in the brake link arm.
2) Check that the boss of the brake lift arm is inserted securely.
3) Check that the boss of the brake change arm is inserted securely.

[Adjustment after reinstalling]
1) Mechanism State Switch Adjustment

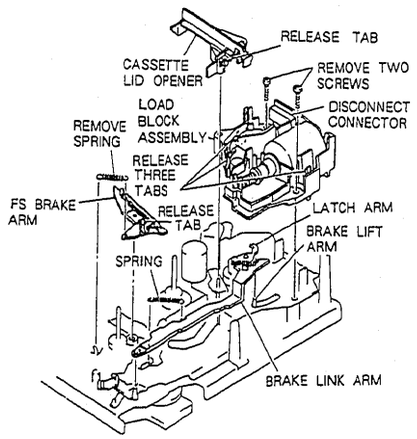


Fig. 6-10

11. Load Bracket Assembly, Take-up Brake Assembly and Drawer Pin

[Caution during work]
1) Release the boss of the loading slide gear from the hole in the lift arm when lifting the bracket assembly.

[Caution when reinstallation]
1) Attach the drawer pin to the load bracket assembly so the drawer spring of the load bracket assembly is not damaged.
2) After attaching the drawer pin, set the VCR to the play mode without loading a cassette (see item 9 on page 4-11). Check that the drawer pin does not lift.

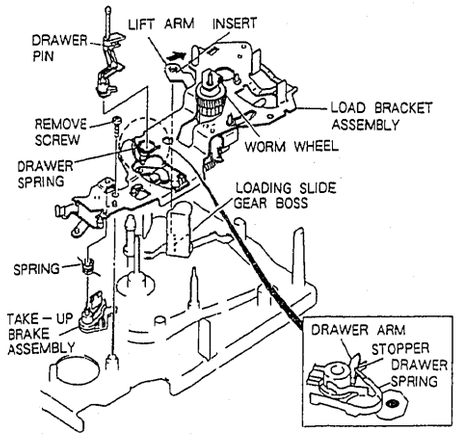


Fig. 6-11

[Caution when reinstallation]
3) Lift the drawer pin slightly in the EJECT mode and release it slowly. Check that the drawer pin is lowered by the drawer spring firmly and is returned to the state in which it is in close contact with the chassis.

12. Brake Operation Arm, Mode Gear A/B, Worm Wheel, Pressure Roller Operation Arm, Mode Change Arm and Brake Lift Arm

[Caution when reinstalling]
1) Check that the bosses of each gear are inserted into the specified grooves in the mode gear.

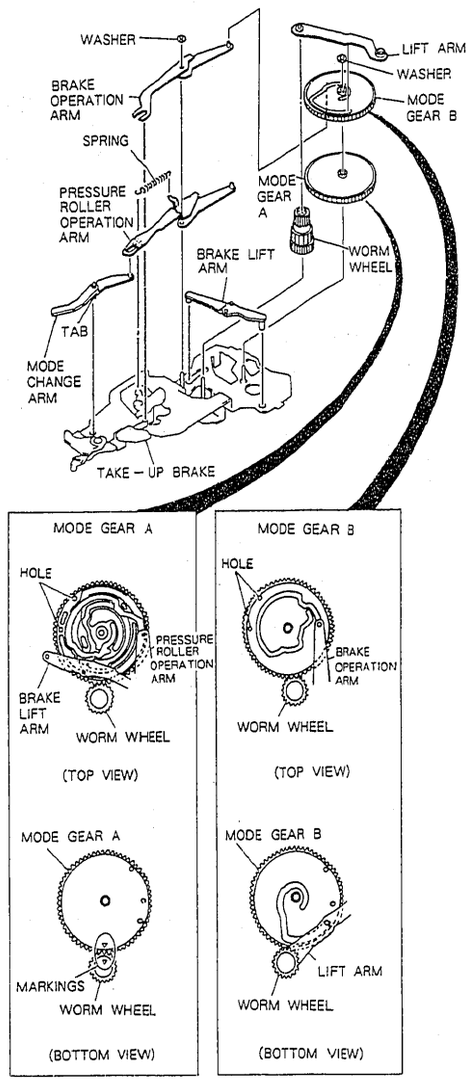


Fig. 6-12

13. Cylinder Motor Base and Supply/Take-up Loading Arms

* Components to remove previously
1) Cassette Loading Mechanism (Item 5-1)
2) Cylinder Motor Assembly (Item 6-2)

[Caution during work]
1) Release tab when removing the take-up loading arm.

[Caution when reinstalling]
1) Align the markings on each gear.

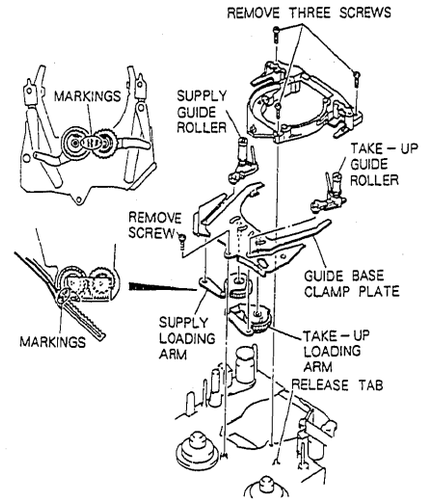


Fig. 6-13

14. Take-up Pulley and Clutch Gear Assembly

* Components to remove previously
1) Slider Block (Item 6-7)
2) Reel Drive Idler (Item 6-7)

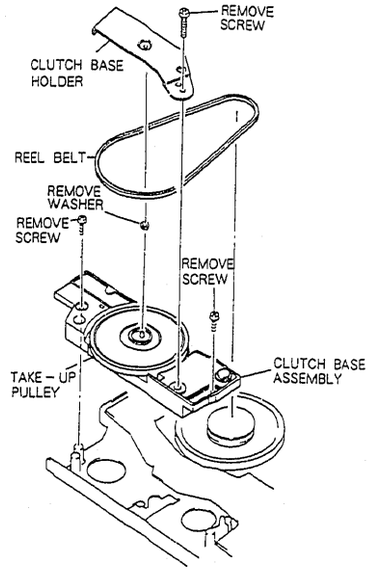


Fig. 6-14

15. Take-up Gear, Change Arm, Change Gear, Relay Gear, FL Change Gear and FL Change Arm

[Befor performing the work]
The components shown here are the gears and arms located inside the clutch gear assembly. As these components are not supplied, use the figure as a reference for reinstallation.

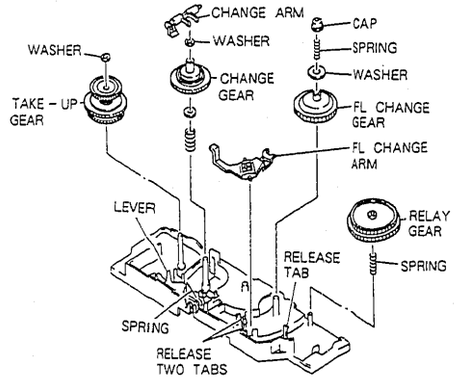


Fig. 6-15

7. ATTACHING THE ROTOR MAGNET PLATE TO THE CYLINDER MOTOR

[Caution when installation]
1) The rotor magnet plate attached to the base of the cylinder motor (illustrated as the top in the figure below) is equipped with magnetic poles. If it is attached in reverse, the VCR will not operate normally. Attach it correctly following the procedure below.

[How to attach]
1) There are holes in the rotor magnet plate and cylinder plate attaching bracket. Attach the rotor magnet plate so that hole (A) in the plate and hole (B) in the bracket across from the screw holes.

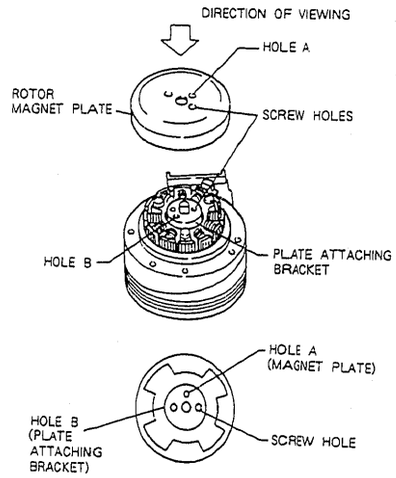


Fig. 7-1

CHAPTER 3

ELECTRIC CIRCUIT ADJUSTMENT

Test equipment and tapes necessary for adjustment

1) Dual-trace oscilloscope
2) Color bar generator
3) VTVM
4) DC voltmeter
5) Frequency counter
6) Monitor TV (with A/V jacks)
7) Alignment tapes
   - MH-1 : Parts No. 7099046
   - 30HMP2-1 : Parts No. 7099089
   - 24HMASF-2: Parts No. 7099153 (Hi-Fi alignment tape)
8) Blank tape
9) MTS sound signal generator

Cautions on adjustments

1) If there are no special instructions, the following conditions apply.
   - Oscilloscope probe: 10:1
   - Oscilloscope synchronization: Internal sync
   - Ground of test equipment: TP602 (GND) on Main P.C.B
2) When making more than one adjustment, perform the adjustments in the order listed.

Servicing positions

The circuit boards can be set to the servicing positions as follows when servicing and adjusting the VCR.

When the top and bottom covers are removed, most adjustments can be done without the main circuit board being opened.

1) Remove the top and bottom covers and the front panel. (See the items in the section on case removal in chapter 2.)
2) Open the Timer circuit board and lift up the entire Main circuit board. (See the items in the section on circuit board removal in chapter 2.)
3) Lay an insulation sheet on the mechanism and place the whole main circuit board on it.

[Caution]

- Attach the insulators temporarily before removing the front panel. Otherwise, the unit will become unstable.

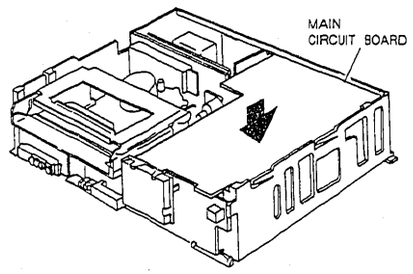


Fig. 1

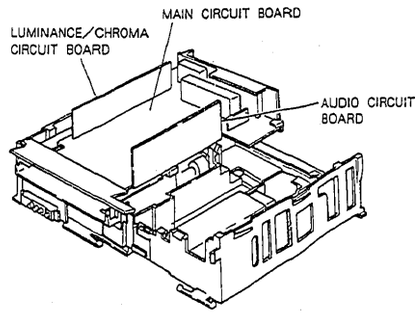


Fig. 2

[Caution]

When the VCR is set to the servicing position, it is not possible to operate the VCR from the switches on the front panel. Use the remote control to operate the VCR.
Press S702 (EJECT) on the Timer circuit board to remove the cassette. (Fig.3)

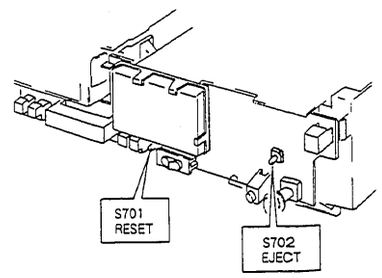


Fig. 3

Usable servicing methods

1. To reset the microprocessor
   The timer microprocessors is not reset when the power cord is unplugged from the AC outlet as its power is backed up by the backup circuit. Press switch S701 on the Timer circuit board to reset the timer microprocessor.

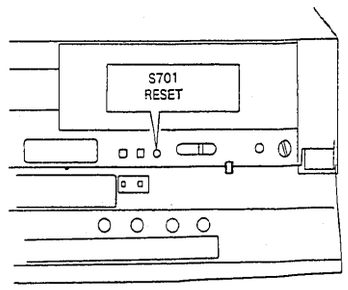


Fig. 4

2. To set the VCR to the test mode.
   Connect TP602 to TP901 on the Main circuit board to set the servo circuit to the EP playback mode (test mode).

3. To set the VCR to the loading state without loading a cassette

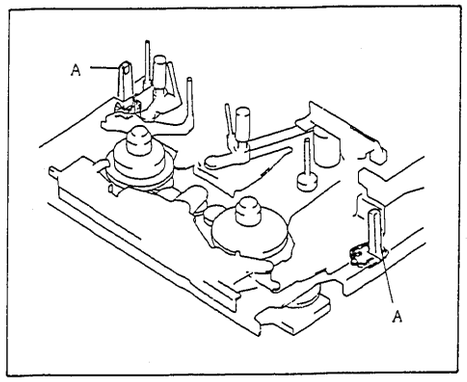
1) Unplug the power cord from the AC outlet.
2) Cover the supply and take-up end sensors (sections A in the figure below) with black masking tape, etc. to shut off the light.
3) Plug the power cord into an AC outlet.
4) Turn the VCR on.
   The VCR can accept the inputs of each mode in this state. However, the rewind operation cannot be performed for more than a few seconds because the take-up reel disk is in the stop state and reel pulses cannot be detected.

* When the front panel is removed, the VCR cannot be operated from the switches on the front panel.
Use the remote control to operate the VCR.

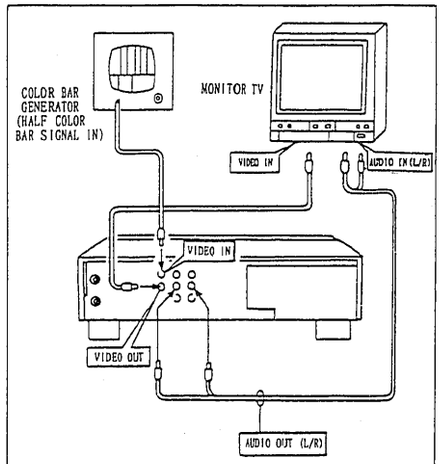
[Cautions]

Always return the VCR to the original state in the following order after the above operations have been completed.

1) Remove the masking tape, etc. from the supply and take-up end sensors.
2) Unplug the power cord from the AC outlet once to reset the system control microprocessor.

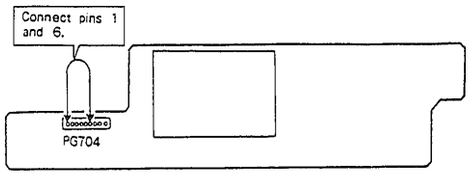


4. Test equipment connection
   - Connect test equipment as shown when not otherwise specified.



Setting the conditions of VCR
(1) Set to the external input mode.

5. To short-circuit when adjusting the level meter
   - Connect (short-circuit) pins 1 and 6 of PG704 when adjusting the level meter with the front panel removed. (When the front panel is attached, press the STOP button behind the front door.)



Adjustment Parts Locations .

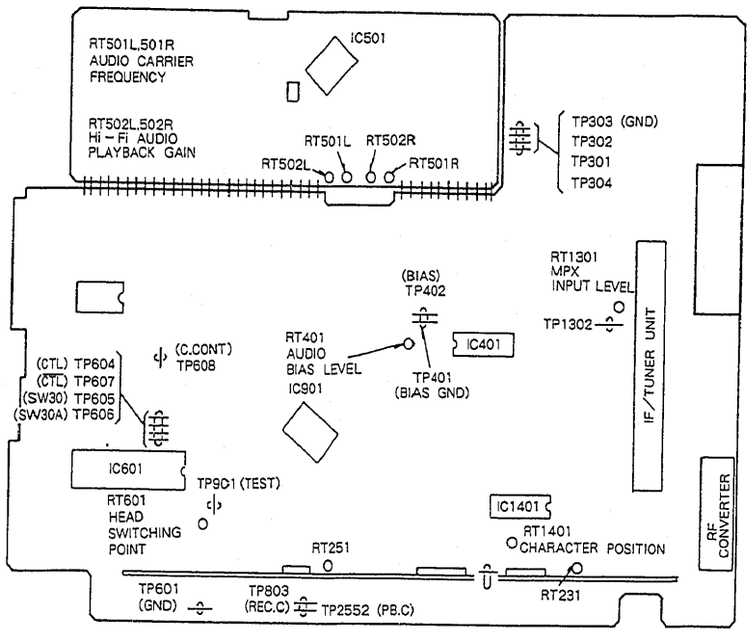


Fig. 1 Audio Circuit Board (Component Side)

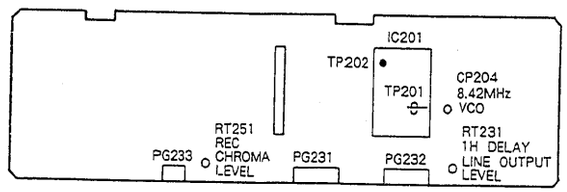
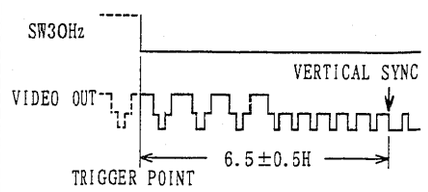


Fig. 2 Main Circuit Board (Solder Side)

1. SERVO CIRCUIT ADJUSTMENT

1. Head Switching Point Adjustment

Purpose of adjustment and fault occurring if incomplete			
Purpose: To set the video head switching point during play to approximately the center where the CH-1 and CH-2 envelopes overlap each other.		Fault: · The vertical sync signal is degraded and vertical jitter occurs. · Switching noise appears across the bottom of the screen.	
Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
· Oscilloscope	· CH-1: VIDEO OUT · CH-2: TP605(SW30Hz)	· Play alignment tape (color bar signal)	· RT601 (SWITCHING POINT)
· Alignment tape (MH-1) (Parts No.7099046)			
Adjustment Procedure Vertical sync signal: Set to 6.5H±0.5H from the trailing edge (trigger position) of the SW30Hz pulse. <Settings of oscilloscope> · Trigger with CH-2. · Set the sync slope to "-".		Waveforms  	

2. Vertical Jitter Correction (Adjust with the front panel attached)

Purpose of adjustment and fault occurring if incomplete			
Purpose: To Suppress vertical jitter during slow motion and still play.		Fault: Vertical jitter occurs in the picture during slow motion and still play.	
Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
· Color bar generator · Monitor TV · Blank tape	· VIDEO IN · Check with monitor TV	· Record color bar signal and play it back with the same VCR.	· TRACKING UP (behind the front door) · TRACKING DOWN (behind the front door)
Adjustment Procedure - EP V. jitter correction - Record in the EP mode and play back in the still mode with the same VCR. 1) Press the PAUSE button of the VCR to set it to the still play mode. 2) Suppress vertical jitter in the picture.		- SP V. jitter correction - Record in the SP mode and play back in the still mode with the same VCR. 1) Press the PAUSE button of the VCR to set it to the still play mode. 2) Suppress vertical jitter in the picture.	

3. Reverse Slow Tracking Preset Adjustment
(Be sure to perform this adjustment after replacing IC702)

Purpose of adjustment and fault occurring if incomplete			
Purpose: To adjust the timing with which brake pulses are generated for the capstan motor during reverse slow play and minimize noise.		Fault: · Noise occurs during slow play and the picture is difficult to see.	
Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
· Color bar generator · Monitor TV · Blank tape	· VIDEO IN · Check with monitor TV	· Unplug the power cord from AC outlet to set slow tracking to the center.	· TRACKING UP (behind the front door) · TRACKING DOWN (behind the front door)
Adjustment Procedure [EP Adjustment] Record in the EP mode and play back with the same VCR. 1) Forcibly set the VCR to the reverse slow mode. 2) Observing the monitor screen, adjust so that noise is evenly distributed in the upper and lower halves of the screen. 3) Press the play button to return the VCR to the play mode. (When returned to the play mode, the preset data is written to the EAROM.) [Caution] Perform this adjustment with the front panel attached.		[SP Adjustment] Record in the SP mode and play back with the same VCR. 1) Forcibly set the VCR to the reverse slow mode. 2) Observing the monitor screen, adjust so that noise is evenly distributed in the upper and lower halves of the screen. 3) Press the play button to return the VCR to the play mode. * Frocibly setting to the reverse slow mode : Press the PAUSE button of the VCR and the TRACKING UP and TRACKING DOWN buttons of the remote control simultaneously during play.	

4. Forward Slow Tracking Preset Adjustment
(Be sure to perform this adjustment after replacing IC702)

Purpose of adjustment and fault occurring if incomplete
Purpose: To adjust the timing with which brake pulses are generated for the capstan motor during slow play and minimize noise.
Fault: · Noise occurs during slow play and the picture is difficult to see.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
· Color bar generator · Monitor TV · Blank tape	· VIDEO IN · Check with monitor TV	· Unplug the power cord from AC outlet to set slow tracking to the center.	· TRACKING UP (behind the front door) · TRACKING DOWN (behind the front door)

Adjustment Procedure
[EP Adjustment]
Record in the EP mode and play back with the same VCR.
1) Forcibly set the VCR to the forced slow mode.
2) Observing the monitor screen, adjust so that noise is evenly distributed in the upper and lower halves of the screen.
3) Press the play button to return the VCR to the play mode. (When returned to the play mode, the preset data is written to the EAROM.)

[Caution]
Perform this adjustment with the front panel attached.

[SP Adjustment]
Record in the SP mode and play back with the same VCR.
1) Forcibly set the VCR to the forced slow mode.
2) Observing the monitor screen, adjust so that noise is evenly distributed in the upper and lower halves of the screen.
3) Press the play button to return the VCR to the play mode.
* Frocibly setting to the forced slow mode : Press the PLAY button of the VCR and the TRACKING UP and TRACKING DOWN buttons of the remote control simultaneously during play.

2. VIDEO CIRCUIT ADJUSTMENTS
1. 8.42MHz VCO Level Adjustment

Purpose of adjustment and fault occurring if incomplete
Purpose: To set the VCO oscillation frequency.
Fault: Colors are displaced or color disappears.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
· Color bar generator · DC Voltmeter	· VIDEO IN · TP201	· Receive a color bar signal (Line input) (E-E mode)	· CP204 (8.42MHz VCO LEVEL)

Adjustment Procedure
1) Adjust CP204 so the DC level is 2.35±0.05V.

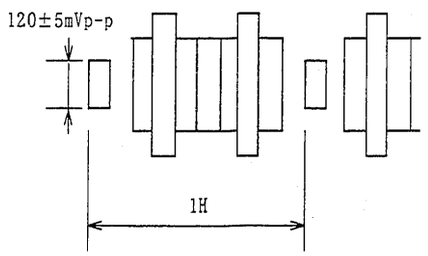
2. Record Chroma Level Adjustment

Purpose of adjustment and fault occurring if incomplete
Purpose: To set the record chroma level to an optimum value.
Fault: Beats may occur or the color may become poor.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Points
· Color bar generator · Oscilloscope · Blank tape	· VIDEO IN · TP803(Rec Chroma)	· Receive a color bar signal (Line input) · REC mode · EP mode	· RT251 (REC CHROMA LEVEL)

Adjustment Procedure
1) Adjust RT251 so that the color burst level is 120±5mVp-p.

Waveforms



3. 1H Delay Line Output Level Adjustment

Purpose of adjustment and fault occurring if incomplete
Purpose: To set the input and output levels of the CCD 1H DELAY LINE the same.
Fault: Switching noise is conspicuous when dropout is compensated.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
· Oscilloscope · Alignment tape (MH-1) (Parts No.7099046)	· CH-1: IC201-pin23 · CH-2: TP605 (SW30Hz)	· Play alignment tape (Color bar signal)	· RT231 (1H DELAY LINE OUTPUT LEVEL)

Adjustment Procedure
1) Adjust RT231 to minimize level at the waveform.

Waveforms

3. AUDIO CIRCUIT ADJUSTMENT
1 .Audio Carrier Frequency Adjustment

Purpose of adjustment and fault occurring if incomplete
Purpose: To set the audio carrier frequency to the specified value.
Fault: Compatibility with tapes recorded by another VCR cannot be obtained.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Points
· Frequency counter	· TP301 (when adjusting RT501L) · TP302 (when adjusting RT501R)	· No-signal record mode (SP mode)	· RT501L (L-CH) · RT501R (R-CH) (CARRIER FREQUENCY)

Adjustment Procedure
1) RT501L : The frequency counter reads 1300kHz±1kHz.
2) RT501R : The frequency counter reads 1700kHz±1kHz.

2 .Hi-Fi Audio Playback Gain Adjustment

Purpose of adjustment and fault occurring if incomplete
Purpose: To set the Hi-Fi audio playback level to the specified value.
Fault: The optimum volume cannot be obtained.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Points
· VTVM · Hi-Fi alignment tape [24HMASF-2] (Parts No. 7099153)	· AUDIO OUT L (when adjusting RT502L) · AUDIO OUT R (when adjusting RT502R)	· Play Hi-Fi alignment tape.	· RT502L (L-CH) · RT502R (R-CH) (AUDIO PLAYBACK LEVEL)

Adjustment Procedure
1) RT502L : Set the reading of the VTVM to -4.8dBs±0.1dBs.
2) RT502R : Set the reading of the VTVM to -4.8dBs±0.1dBs.

3. AUDIO OUT-2 Jack Output Level Check

Purpose of adjustment and fault occurring if incomplete
Purpose: To check the output level at the AUDIO OUT-2 jack.
Fault: · Sound becomes abnormal.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Points
· C/R oscillator · VTVM	· AUDIO IN (L-CH) · AUDIO OUT-1 (L-CH)	· E-E mode	———

Adjustment Procedure
1) Adjust the output level of the C/R oscillator so the VTVM reads -4.8±0.1dBs. (1kHz sine wave)
2) Connect the VTVM to the AUDIO OUT-2 jack.
3) Check that the VTVM reads -4.8±2dBs with the headphone level control set to the center.
4) Check that the VTVM reads +2.2±3dBs with the headphone level control set to maximum.
5) If the above values cannot be obtained, check (or replace) the circuit on the audio circuit board, output jack and headphone level control.

4. E-E Audio Level Check

Purpose of adjustment and fault occurring if incomplete
Purpose: To check the audio level in the E-E mode.
Fault: · Sound is abnormal in the E-E mode.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Points
· C/R oscillator · VTVM	· AUDIO IN (L-CH) · AUDIO OUT-1 (L-CH)	· E-E mode	———

Adjustment Procedure
1) Apply a 1kHz, -7.8dB sine-wave signal to the AUDIO IN jack.
2) Check that the VTVM reads -6.8±2dBs.
3) If the above value cannot be obtained, check the audio circuit board and E-E audio line.

5. Bass Boost Level Check

Purpose of adjustment and fault occurring if incomplete
Purpose: To check the low-frequency amplification of the theater sound.
Fault: · The low-frequency is not amplified and sound does not change when the SPECTRA SONIC switch is turned on.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Points
· C/R oscillator · VTVM	· AUDIO IN (L-CH) · AUDIO OUT-1 (L-CH)	· E-E mode	———

Adjustment Procedure
1) Apply a 50Hz, -27.8dBs sine-wave signal to the AUDIO IN jack.
2) Use the SPECTRA SONIC switch of the remote control to set the VCR to the "MUSIC" mode and check that the reading of the VTVM is 8±3dBs higher then in the "OFF" mode. Check that in the level is 16±3dBs higher in the "THEATER" mode.
3) If the above cannot be confirmed, check the bass boost circuit board.

6. Audio Bias Level Adjustment

Purpose of adjustment and fault occurring if incomplete
Purpose: To set the recording bias to the optimum level.
Fault: · Bias too high : High-frequency response deteriorates.
· Bias too low : Sound tends to be distorted.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Points
· VTVM	· TP402 (REC BIAS) · TP401 (BIAS GROUND)	· No-signal record mode (SP mode)	· RT401 (AUDIO BIAS LEVEL)

Adjustment Procedure
RT401 : Set the reading of the VTVM to 2.8mV±0.1mVrms.
[Frequency response check]
1) Connect a C/R oscillator to the AUDIO IN jack.
2) Connect a VTVM to the AUDIO OUT jack.
3) Apply the 1kHz and 5kHz sine-wave signal with the -27.8dBs level and check that the difference in the recording/playback outputs (EP mode) is within +3dB ~ -6dB.
4) If the difference in the recording/playback output levels is over +3dB ~ -6dB, change the audio bias level acoording to the following table. (Readjust)

Difference between 1kHz/5kHz	-6dB or less	-6dB ~ +3dB	+3dB or more
Bias readjustment	2.5mV± 0.1mV	2.8mV± 0.1mV	3.1mV± 0.1mV

7. MPX Input Level Adjustment

Purpose of adjustment and fault occurring if incomplete
Purpose: To set the input level of the MPX signal to the MTS processor in IC1301 from the tuner/IF to the specified level.
Fault: The S/N deteriorates or distortion becomes conspicuous.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
· MTS sound signal generator · VTVM	· VHF IN · TP1302 (MPX IN)	· E-E mode	· RT1301 (MPX INPUT LEVEL)

Adjustment Procedure
1) RT1301 : Set the reading of the VTVM to -19.0dBs±0.1dBs (74mV±2mVrms).

Note : MTS sound signal generator settings
· Audio Freq. : 400Hz
· Mod. signal : L+R

8. Level Meter Adjustment (Be sure to perform this adjustment after replacing IC702)

Purpose of adjustment and fault occurring if incomplete
Purpose: To make the level meter operate correctly.
Fault: · The level meter does not operate normally.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
· C/R oscillator · VTVM	· AUDIO IN (L-CH) · AUDIO OUT-1 (L-CH)	· Line input mode	· TRACKING UP/DOWN (on remote control)

Adjustment Procedure
1) Adjust the level of the C/R oscillator so the VTVM reads -4.8dB +0.5/-0dB.
2) Connect (short-circuit) pins 1 and 6 of PG704 on the timer circuit board and press the TRACKING UP and DOWN buttons of the remote control simultaneously (the short-circuit time: 1 second or more). * See page 3-2 for details.
3) Check that the 0dB segment lights in the level meter.

4. OSD CIRCUIT ADJUSTMENT

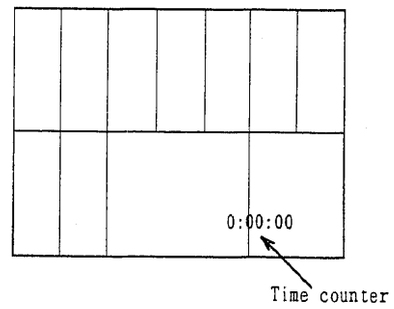
1. Character Position Adjustment

Purpose of adjustment and fault occurring if incomplete
Purpose: To set the position of characters displayed on the screen.
Fault: · The display position of characters is drifted.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
· Color bar generator · Monitor TV	· VIDEO IN · VIDEO OUT	· Receive color bar signal (line input)	· RT1401 (CHARACTER POSITION)

Adjustment Procedure
1) Press the "DISPLAY" switch of the remote control so the time counter is displayed on the monitor screen.
2) RT1401 : Set the display position of the time counter is as shown in the diagram below.

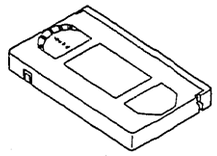
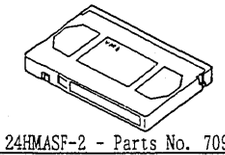
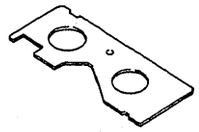
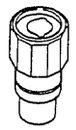
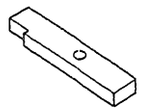
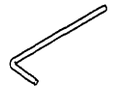
Monitor screen



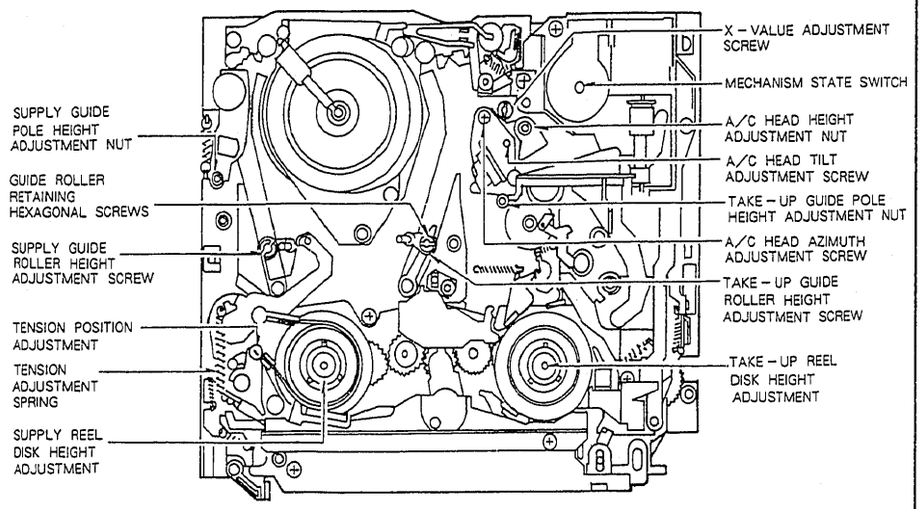
CHAPTER 4

MECHANISM ADJUSTMENT

JIGS AND TAPES FOR ADJUSTMENT

1. Back Tension Meter Parts No.7099004 	2. Alignment Tape - MH-1 - Parts No. 7099046 - 30HMP2-1 - Parts No. 7099089  - 24HMASF-2 - Parts No. 7099153	3. Master Plane Parts No.7099279 
4. Torque Gauge Parts No.7099039 	5. Torque Gauge Adapter Parts No.7099035 	6. Reel Disk Height Jig Parts No.7099038 
7. 1.5mm Hexagonal Wrench 0.9mm Hexagonal Wrench 		

ADJUSTMENT PARTS LOCATIONS


X-VALUE ADJUSTMENT SCREW
MECHANISM STATE SWITCH
A/C HEAD HEIGHT ADJUSTMENT NUT
A/C HEAD TILT ADJUSTMENT SCREW
TAKE-UP GUIDE POLE HEIGHT ADJUSTMENT NUT
A/C HEAD AZIMUTH ADJUSTMENT SCREW
TAKE-UP GUIDE ROLLER HEIGHT ADJUSTMENT SCREW
TAKE-UP REEL DISK HEIGHT ADJUSTMENT
SUPPLY GUIDE POLE HEIGHT ADJUSTMENT NUT
GUIDE ROLLER RETAINING HEXAGONAL SCREWS
SUPPLY GUIDE ROLLER HEIGHT ADJUSTMENT SCREW
TENSION POSITION ADJUSTMENT
TENSION ADJUSTMENT SPRING
SUPPLY REEL DISK HEIGHT ADJUSTMENT

Top View of Mechanism

MECHANICAL PARTS ADJUSTMENT

1. Mechanism State Switch Adjustment

Purpose: To detect the mechanism state correctly and prevent malfunctions.

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Blank tape	——	· Eject mode (with the cassette ejected)	· Mechanism state switch · Mode gear

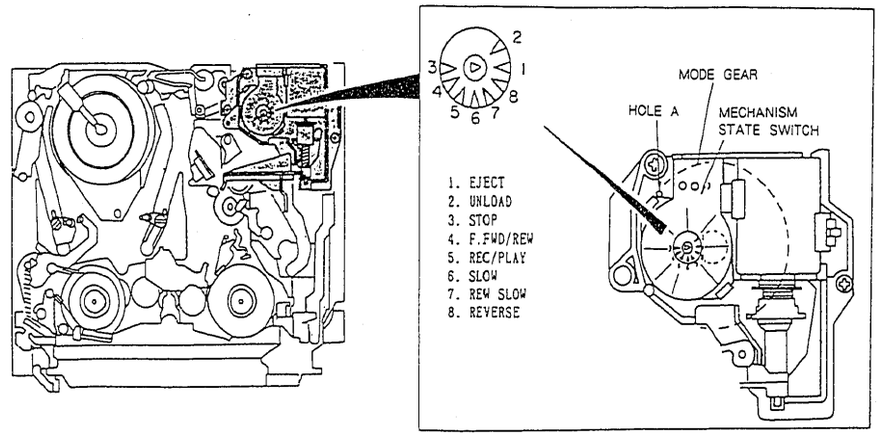
Adjustment procedure

1) Check that the arrow on the center shaft of the mechanism state switch points to the arrow of mechanism mode indication number 1. Also check that hole (A) beside the mechanism state switch and the hole in the mode gear are aligned.

2) If the above alignments are not obtained, adjust as follows.
   1. Remove the mechanism state switch/loading motor assembly. (See "MAIN MECHANICAL COMPONENTS REMOVAL" in CHAPTER 2.)
   2. Move the mode gear to align the position of hole (A).
   3. Turn the gear on the back of the mechanism state switch so that the arrow on the center shaft of the switch points to the arrow of mechanism mode indication number 1.
   4. Reinstall the mechanism state switch/loading motor assembly in the above condition.

3) Load a blank tape and perform various operations to check that loading and unloading are performed correctly.

Adjustment diagram



TAPE TRANSPORT SYSTEM PARTS ADJUSTMENT

The tape transport system is the path from the supply reel disk passing through the video heads to the take-up reel disk. The transport system parts, especially the parts which directly come into contact with a tape, should be kept clean without scratches, dust, oil, etc.
The tape transport system has been adjusted before the unit is shipped from the factory. Therefore, when parts in the transport system are replaced, the transport system is stabilized by only adjusting the new parts correctly.

1. Reel Disk Height Adjustment

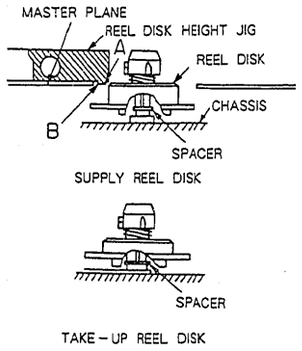
Purpose: To set the reels of the cassette to the specified height, thus determining the height of tape.

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Master plane (Parts No.7099279) · Reel disk height jig (Parts No.7099038)	1) Remove the cassette loading mechanism. 2) Mount the master plane and place the reel disk height jig on it.	——	· Spacers in the supply and take-up reel disks

Adjustment procedure
1) Check that the reel disk is between sections A and B of the reel disk height jig.
2) If the disk is not between sections A and B of the jig, replace the spacer (0.5mm thick) in the reel disk or adjust them.

[Caution]
When the tension arm and tension band are removed, adjust the tension pole position and tension after reinstalling them.

Adjustment diagram



2. Tension Pole Position and Tension Adjustment

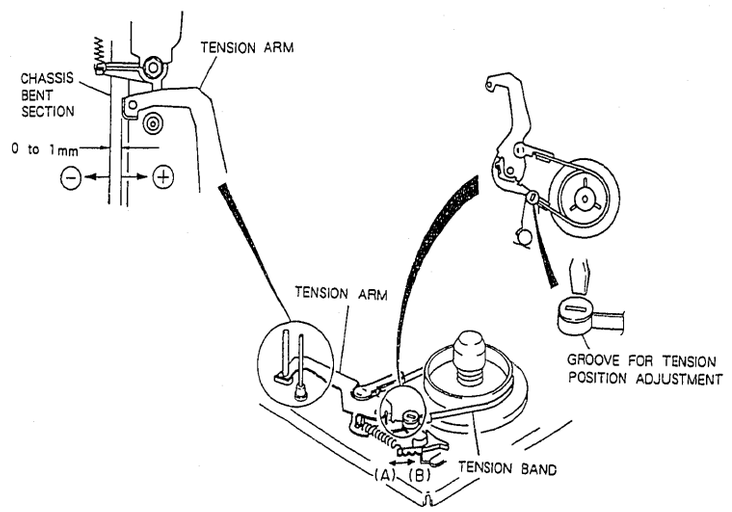
Purpose: To make the tension of tape constant so that the contact between the video heads and tape is stabilized.

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
Position adjustment ——	——	1) Remove the top cover. 2) Set the VCR to the loading state without inserting a cassette. (See page 4-11)	Position adjustment: Tension band holder
Tension adjustment · Back Tension Meter (Parts No.7099004)	——	Tension adjustment 3) Play the tension cassette.	Tension adjustment: Tension spring hooking position

Adjustment procedure
- Position Adjustment -
1) Insert a flat bladed screwdriver into the groove for the tension position adjustment and set the clearance between the tension pole and chassis to 0 to +1.0mm.
2) After adjustment is completed, perform loading without inserting a cassette and recheck the tension pole position.

- Tension Adjustment -
Reading of Back Tension Meter: 34 to 44 g-cm (reference value)
If the reading is higher than the reference, move the spring in direction (A).
If the reading is lower than the reference, move the spring in direction (B).
Caution: When the tension position is changed greatly (more than 6 g-cm), recheck the tension pole position. If it is drifted, readjust the tension pole position and tension.

Adjustment diagram



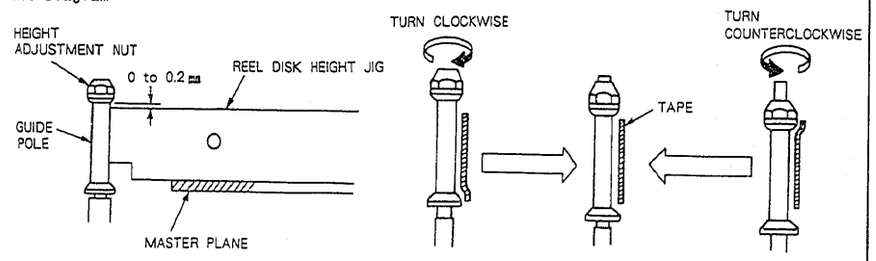
3. Guide Pole Height Adjustment

Purpose: To regulate the tape height.

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Master plane (Parts No.7099279) · Reel disk height jig (Parts No.7099038)	1) Remove the cassette loading mechanism. 2) Mount the master plane and place the reel disk height jig on it.	——	· Nuts on the supply and take-up guide poles
· Blank tape	——	· Playback mode	

Adjustment procedure
1) Set the clearance between the bottom of the guide pole's upper flange and top of the reel disk height jig is 0 to 0.2mm.
2) Load a blank tape to run it and check that the tape does not ride over the upper and lower flanges of the guide pole.
3) If the tape rides over either flange, adjust the height of guide pole as follows.
If the tape rides over the upper flange, turn the nut counterclockwise.
If the tape rides over the lower flange, turn the nut clockwise.

Adjustment diagram



4. Guide Roller Height Adjustment

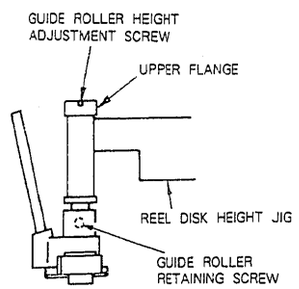
Purpose: To regulate the height of tape so that the bottom of tape runs along the tape guide line on the cylinder.

Coarse Adjustment

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Master plane (Parts No.7099279) · Reel disk height jig (Parts No.7099038) · 0.9mm Hexagonal wrench	1) Remove the cassette loading mechanism. 2) Mount the master plane and place the reel disk height jig on it.	——	Height adjustment screws on the supply and take-up guide rollers

Adjustment procedure
1) Loosen the guide roller retaining screw (so that the guide roller does not turn during loading, unloading and play).
2) Align the bottom of the guide roller's upper flange and the top of the reel disk height jig.
3) Perform the precise adjustment continuously.

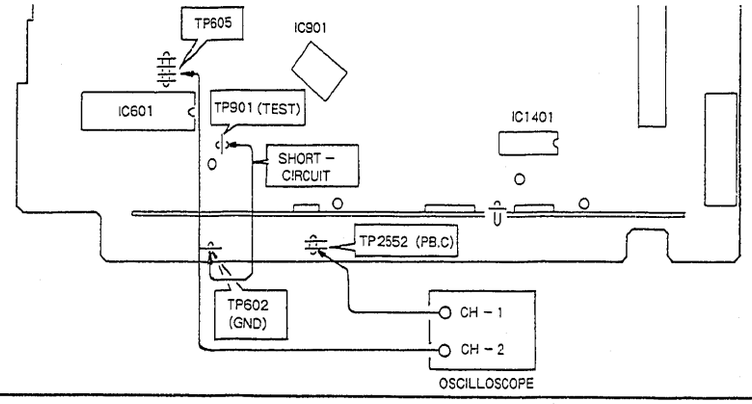
Adjustment diagram



Precise Adjustment

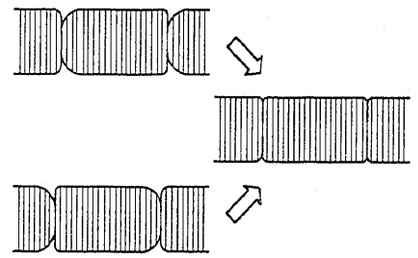
Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Oscilloscope	· CH-1: TP2552 (PB FM) · CH-2: TP605 (SW30Hz)	· Play alignment tape (Color bars section)	· Guide roller height adjustment screws
· Alignment tape (30HMP2-1) (Parts No.7099089)			
· 0.9mm Hexagonal wrench			

Connection diagram

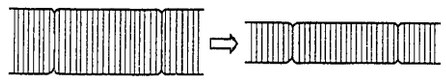


Adjustment procedure
1) Playback the alignment tape : Auto tracking ON (when this adjustment is performed after the cylinder has been replaced, set the tracking control so that the FM output is maximum.)
2) Connect TP602 and TP901 on the main board.
3) Height adjustment screw : Flatten the FM envelope.
4) Press the tracking control up and down buttons.
5) Check that the FM drops at the start and end of FM envelope are uniform.
6) Tighten the guide roller retaining screw.
7) Remove the jumper.

Waveforms



Turn the guide roller height adjustment screw slightly to flatten the waveform.



Auto tracking ON

Press the tracking control buttons.

5. Audio / Control (A/C) Head Adjustment

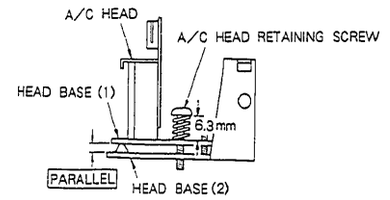
Purpose: To keep the contact between the tape and head even so the specified track is recorded and played back.

Coarse Adjustment

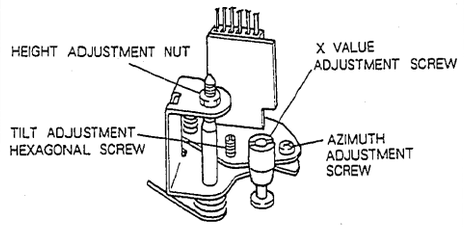
Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Master plane (Parts No.7099279) · Reel disk height jig (Parts No.7099038) · 1.5mm Hexagonal wrench	1) Remove the cassette loading mechanism. 2) Mount the master plane and place the reel disk height jig on it.	——	· A/C head retaining screw · Azimuth adjustment screw · Height adjustment nut · Tilt adjustment screw
· Blank tape	——	· Run the blank tape.	

Adjustment procedure/adjustment diagrams

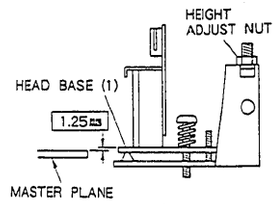
1) A/C head retaining screw: Check that the spring section of the A/C head retaining screw protrudes 6.3mm over the top of head base (1).



2) Tilt adjustment hexagonal screw, azimuth adjustment screw: Make head bases (1) and (2) parallel.

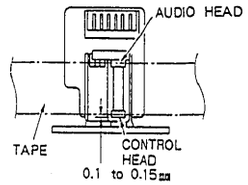


3) Height adjustment nut: Set the clearance between the master plane and head base (1) to approx. 1.25mm.



4) Remove the adjustment jigs, load a blank tape and set the VCR to the play mode.

5) Check that there is no conspicuous curling and riding over around the A/C head. If there is conspicuous curling or riding over, readjust the tilt adjustment hexagonal screw, azimuth adjustment screw and height adjustment nut. When the bottom edge of tape is 0.1 to 0.15mm from the bottom edge of the control head's core, the height of A/C head is ideal.



6) Perform the precise adjustment continuously.

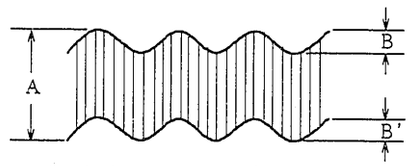
Precise Adjustment

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Oscilloscope	· AUDIO OUT jack	· Play alignment tape (7KHz section if MH-1 alignment tape is used)	· Azimuth adjustment screw · Height adjustment nut · Tilt adjustment screw
· Alignment tapes (Parts No. 7099046) (Parts No. 7099089)	——		
· 1.5mm Hexagonal wrench			

Adjustment procedure

1) Adjust the azimuth adjustment screw, height adjustment nut and tilt adjustment hexagonal screw slightly and alternately: Make the audio output maximum and flat (minimum fluctuations).

Waveform diagram



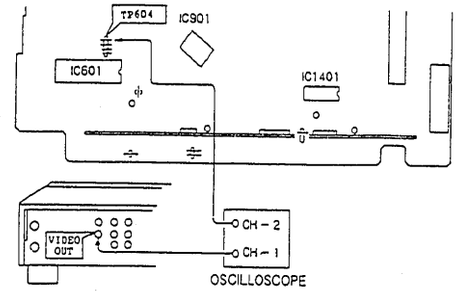
A: Maximum BB': Minimum

6. X Value Adjustment

Purpose: To obtain compatibility with other VCRs.

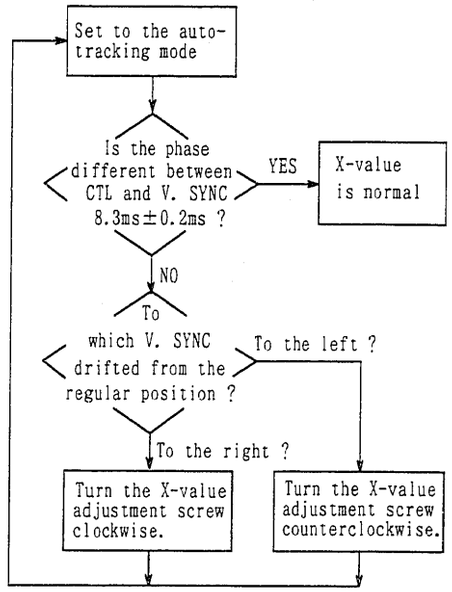
Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Oscilloscope	· CH-1: VIDEO OUT jack · CH-2: TP604 (CTL)	· Play alignment tape (Step waveform if MH-1 alignment tape is used)	· X value adjustment screw
· Alignment tapes (Parts No. 7099046) (Parts No. 7099089)	——		
· 1.5mm Hexagonal wrench			

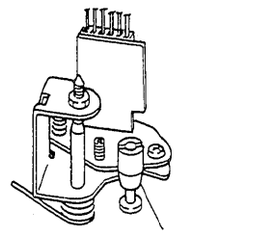
Connection diagram



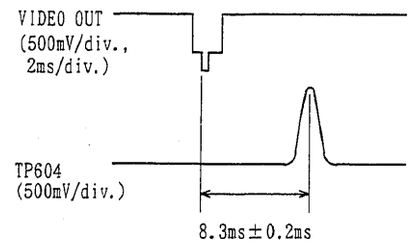
Adjustment procedure

Adjust so that the phase different between the CTL pulse (positive pulse) and the V. SYNC component in the video signal is 8.3ms±0.2ms when the autotracking function operates.


Set to the auto-tracking mode
Is the phase different between CTL and V. SYNC 8.3ms±0.2ms ?
YES
X-value is normal
NO
To which V. SYNC drifted from the regular position ?
To the left ?
To the right ?
Turn the X-value adjustment screw clockwise.
Turn the X-value adjustment screw counterclockwise.



Waveforms



7. Adjustments After Replacing Cylinder (Video Heads)

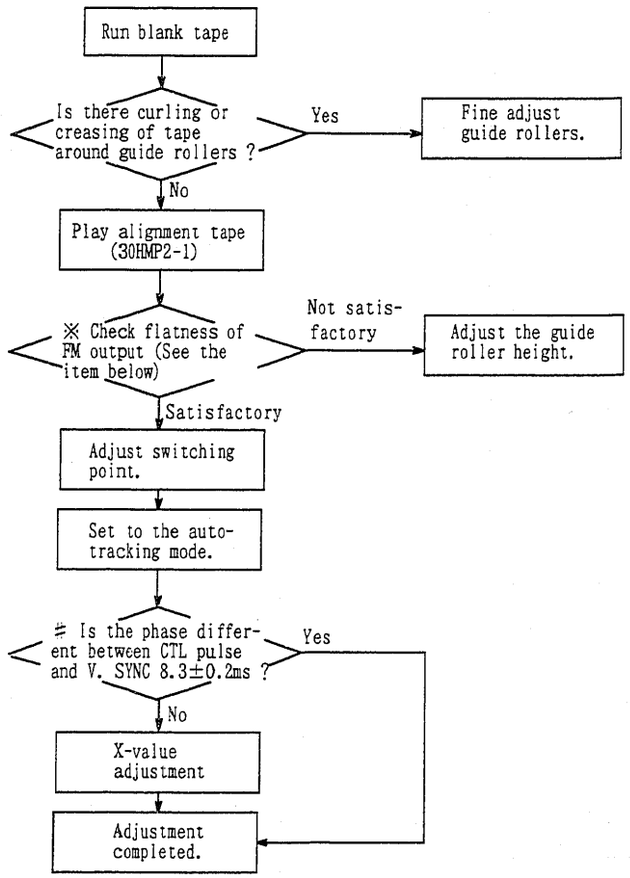
Purpose: To suppress drift in the height relative to the guide roller and to minimize the X value after replacing the cylinder.

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Oscilloscope	Checking the flatness · CH-1: TP2552 (PB FM) · CH-2: TP605 (SW30Hz)	· Run the blank tape · Play alignment tape (Stairsteps section)	· Guide rollers (precise adjustment on page 4-6) · Head switching point (page 3-3) · X value (page 4-8)
· Alignment tapes (Parts No.7099046) (Parts No.7099089)			
· Blank tape			
· 0.9mm/1.5mm Hexagonal wrenches			
· X value adjustment screwdriver			

Checking/adjustment procedure

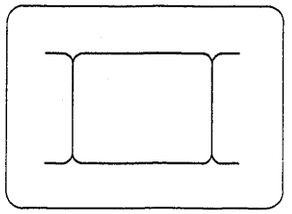
NOTE-1 : Connect test equipment referring to connection diagram on page 4-6 when checking the item marked ※.

NOTE-2 : Connect test equipment referring to connection diagram on page 4-8 when checking the item marked #.

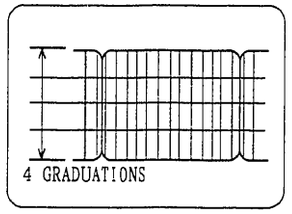

Run blank tape
Is there curling or creasing of tape around guide rollers ?
Yes
Fine adjust guide rollers.
No
Play alignment tape (30HMP2-1)
※ Check flatness of FM output (See the item below)
Not satis-factory
Adjust the guide roller height.
Satisfactory
Adjust switching point.
Set to the auto-tracking mode.
Is the phase differ-ent between CTL pulse and V. SYNC 8.3±0.2ms ?
Yes
No
X-value adjustment
Adjustment completed.

Checking procedure of the flatness and fluctuations of FM output and waveform diagrams

1) Set to the auto tracking mode.

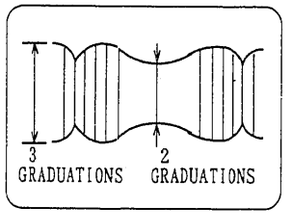


2) Fine tune the voltage level range of the oscilloscope to set the FM output to 4 graduations.



3) Press the tracking control buttons to set the maximum amplitude of the FM output to 3 graduations.

4) Check that the minimum amplitude is more than 2 graduations.



5) Check that the level fluctuations between the maximum and minimum amplitudes are less than 13%.

8. Tension/Torque Checks

Purpose: It is necessary to check the tension, torque and compression force at the tape take-up section and moving section to make the tape running smooth and satisfy the basic performance of the VCR. Check these if the tape running is not smooth or the tape speed is abnormal.

Test equipment/jigs	State of VCR
· Torque gauge · Torque gauge adapter	· Set the VCR to each operation mode without inserting a cassette. (See page 4-11)

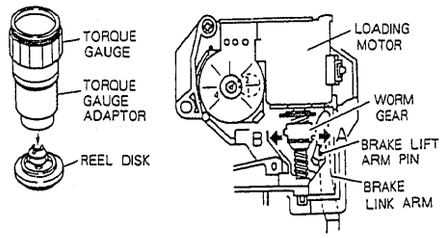
Item	VTR operation mode	Measured reel	Measured value
Main brake torque	Stop (Note)	Supply & take-up reels	60 ~ 180 g·cm
Slack removal torque	Unloading	Supply reel	120 ~ 250 g·cm
Fast forward torque	Fast forward	Take-up reel	400 g·cm or more
Rewind torque	Rewind	Supply reel	400 g·cm or more
Take-up torque	Play	Take-up reel	75 ~ 130 g·cm
Back-tension torque	Fast forward	Supply reel	3 ~ 13 g·cm
	Rewind	Take-up reel	3 ~ 13 g·cm
	Super rewind	Take-up reel	8 ~ 18 g·cm
	Reverse play	Take-up reel	30 ~ 60 g·cm
	Reverse slow	Take-up reel	60 ~ 120 g·cm
Slow torque	Slow	take-up reel	40 ~ 90 g·cm
Reverse play torque	Reverse play	Supply reel	140 ~ 190 g·cm

Checking method

The values are measured using a torque gauge and torque gauge adapter with the torque gauge fixed.

Note: Turn the worm gear in the direction of arrow (A) in the stop mode and shift the pointer on the mechanism state switch to "4" so as to apply the main brake to the supply reel disk. Then turn the worm gear in the direction of arrow (B) so that brake link arm is released from the brake lift arm pin. (Set the reel drive idler to the center position.)

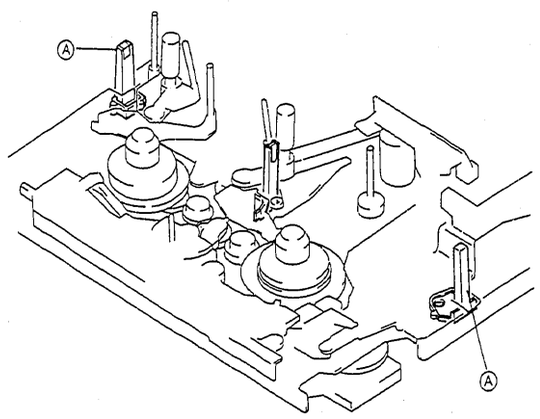
Adjustment diagram



9. To Set the VCR to the Loading State without Inserting a Cassette

1) Remove the top cover and front panel. 2) Remove the cassette loading mechanism. 3) Unplug the power cord form the AC outlet. 4) Cover the supply and take-up end sensors (sections A in the figure below) with black masking tape, etc. to shut off the light. 5) Plug the power cord into the AC outlet. 6) Turn the VCR on. The VCR can accept the inputs of each mode in this state. However, the rewind operation cannot be performed for more than a few seconds because the take-up reel disk in the stop state and reel pulses cannot be detected.	(Cautions) Always return the VCR to the original state in the following order after the above operations have been performed. 1) Remove the masking tape, etc. from the supply and take-up end sensors. 2) Unplug the power cord from the AC outlet to reset the system control microprocessor.

Adjustment diagram



MAINTENANCE/INSPECTION PROCEDURE

1. Required Maintenance

The recording density of a VCR is much higher than that of an audio tape recorder. VCR components must be very precise, at tolerances of 1/1000 mm, to ensure compatible with other VCRs. If any of these components are worn or dirty, the symptoms will be the same as if the part is defective. To ensure a good picture, periodic inspection and maintenance, including replacement of worn-out parts and lubrications, is necessary.

2. Scheduled Maintenance

Schedules for maintenance and inspection are not fixed because they are greatly according to the way in which the customer uses the VCR, and the environment in which the VCR is used. But, in general home use, a good picture will be maintained if the inspection and maintenance is done every 1,000 hours. The table below shows the relation between time used and inspection period.

Table 1

Average hours used per day	When inspection is necessary: About 1 year	About 18 months	About 3 years
One hour	↓	↓	↓
Two hours	↓	↓	
Three hours	↓		

3. Check before starting Repairs

The following faults can be remedied by cleaning and oiling. Check the need for lubrication and the conditions of cleanliness in the unit. Check with the customer to find out how often the unit is used. If from that you determine that the unit is ready for inspection and maintenance, check the following parts.

Table 2

Phenomenon	Inspection Location
Poor S/N, no color	Dirt on video head or worn video head
Tape does not run or tape is slack	Dirt on pressure roller, reel belt or flywheel belt
Vertical jitter horizontal jitter	Dirt on video head or in tape transport system
Color beats	Dirt on full-erase head
Low volume or sound distorted	Dirt on audio/control head
Fast forward or rewind is not done or rotation is slow	Dirt on reel belt

4. Tools Needed for Inspection and Maintenance

(1) Head cleaning kit
(2) VCR oil kit
(3) Alcohol
(4) Gauze
(5) Screwdriver for adjusting X-value

Table 3 Locations for Greasing and Oiling using the Kit

Name	Oil or Greasing Location
Sonic Slidas Oil (#1600)	Oil low-speed rotating sections
Froil (GB-TS-1)	Lubricate metal or molded sections under light load
Lock paint	Fix adjustment screws

The above oils and greases are in the kit prepared especially for VCR maintenance. Use this kit for lubrication.

5. Maintenance Procedures

5-1 Cleaning

(1) Cleaning video head

First use a cleaning tape. If dirt on head is too stubborn to remove by tape, use the cleaning kit. Moisten the cleaning stick with cleaning fluid at the point indicated. Touch the stick to the head tip and gently turn the head (rotating cylinder) to the right and left. (Do not move the stick vertically and make sure that only the chamois leather on the stick comes into contact with the head. Otherwise, the head may be damaged.)
Thoroughly dry the head. Then test run a tape. If cleaning fluid remains on the video head, the tape may be damaged when in comes into contact with the head surface.

(2) Cleaning the tape transport system and drive system, ect.

Wipe with gauze moistened with alcohol.

Notes:
1) The tape transport system is the system which comes into contact with the running tape. The drive system consists of those parts which run the tape.
2) Make sure that during cleaning you do not touch the tape transport system with the tip of a screwdriver and that no force is applied to the system that could deform it.

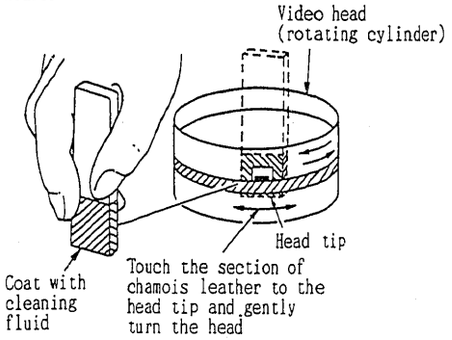
5-2 Lubrication

(1) Guidelines for lubricating with oil

Use the oiler to apply one or two drop of Sonic Slidas oil. Make sure not to use too much oil because it may spill over or leak out coming into contact with rotating parts and causing slippage or other problems. If too much oil is applied, wipe clean with alcohol.

(2) Periodic oil lubrication

Oil specified locations every 1,000 hours.


Video head
(rotating cylinder)
Head tip
Coat with cleaning fluid
Touch the section of chamois leather to the head tip and gently turn the head

5-3 Greasing

(1) Greasing guidelines

Apply grease Froil, with a stick or brush. Do not use excess grease. It may come into contact with the tape transport or drive system. Wipe any excess and clean with gauze moistened with alcohol.

(2) Periodic greasing

Grease specified locations every 5,000 hours.

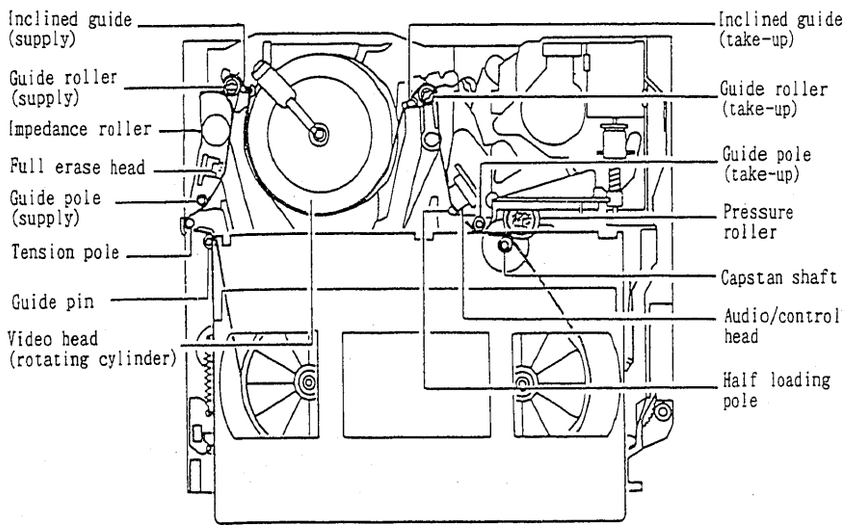


Fig. 1 Tape Transport System

6. Inspection Locations

Phenomenon	Inspection Location	Replacement	
Color beats	Dirt on full erase head		①
Poor S/N, no color	Dirt on video heads	○	②
Vertical jitter	Dirt on video heads Dirt in tape transport system		③
Low volume, sound disordered	Dirt on audio/control head	○	④
Tape does not run. Tape is slack.	Dirt on pressure roller	○	⑤

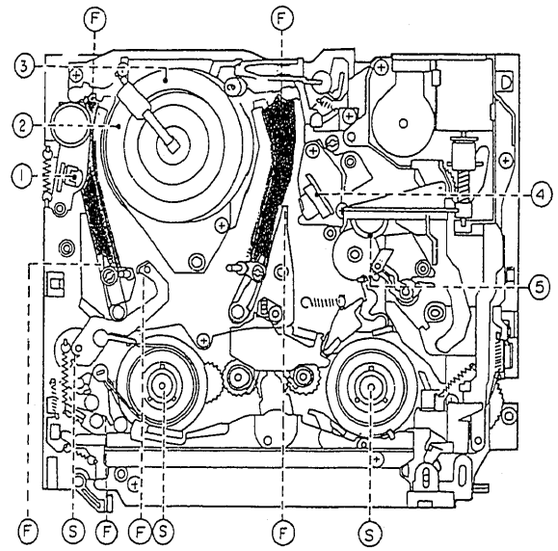


Fig. 2 Top View of Mechanism

Phenomenon	Inspection Location	Replacement
Does not fast forward or rewind, or rotation is slow	Dirt on reel belt	○
Tape dose not run		
Slack tape		

Note:
If locations marked with "○" do not operate normally after cleaning, they are worn. Replace.
See the EXPLODED VIEWS at the end of this manual as well as the above illustrations for the sections to be lubricated and greased.

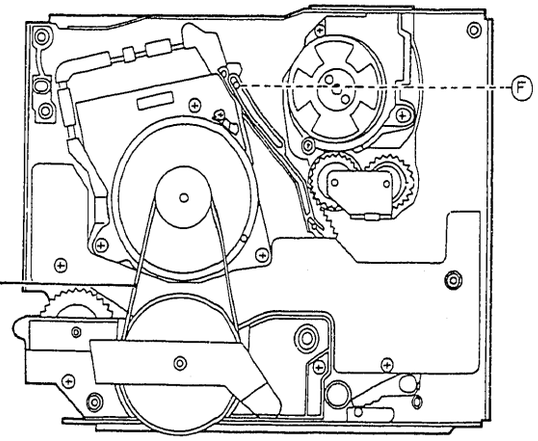


Fig. 3 Bottom View of Mechanism

Ⓢ : Sonic Slidas oil (oil locations)

Ⓕ : Froil (grease locations)

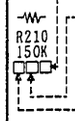
CHAPTER 5

SCHEMATIC/CIRCUIT BOARD DIAGRAMS

BEFORE USING THIS SERVICE REFERENCE MATERIAL

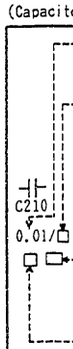
How to read abbreviations

(Resistors)



	Value	Not indicated ·· Ω (ohm) K ····· KΩ
	Toler-ance	Not indicated ·· ±5% K ····· ±10% M ····· ±20%
	Wattage	Not indicated ·· 1/8W (All values other than 1/8W are indicated in the schematic diagrams with W omitted)
	Sort	Not indicated ·· Carbon film RC ····· Carbon solid RW ····· Wire wound RS ····· Metal oxide film RN ····· Metal film
Example: R210 ····· 150kohm, carbon solid RC1/2K 1/2W, +10%		

(Capacitors)



	Value	Not indicated ·· μF P ····· PF
	Dielect-ric strength	Not indicated ·· 50WV (All values other than 50WV and electrolytic capacitors are indicated in the schematic diagrams with WV omitted)
	Toler-ance	Not indicated ·· ±10% J ····· ±5% M ····· ±20% C ····· ±0.25PF Z ····· +80% -20% (No tolerance is indicated for electrolytic capacitors (excluding tantalum and high stability electrolytic capacitors))
	Sort	Not indicated ·· Ceramic General electrolytic (distinguished from ceramic with circuit symbol) MYL ····· Mylar (polyester film) STY ····· Styrol TA ····· Tantalum KU ····· High stability electrolytic MP ····· Metalized paper
Example: C210 0.01/25 ··· Mylar, 0.01μF, 25WV, ±5% MYL J		

Notes:

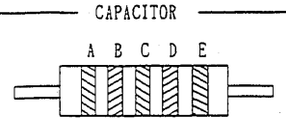
1. Voltages are measured with the negative ⊖ terminal of the power supply as reference in the normal operating mode.
   The voltages in different modes are indicated in the schematic diagrams ; those in parentheses ( ) are in the record mode and those without parentheses are in the play mode.
2. The value, dielectric strength (wattage), tolerance and sort of resistors (excluding variable resistors, etc.) and capacitors are indicated in the schematic diagrams by abbreviations. Replace them correctly, comparing the abbreviations in the schematic diagrams and the table 'how to read abbreviations'.

Cautions on use of MOS IC

1. The MOS IC is inserted in black foam for shipment. This foam is a conductor which short-circuits between the lends to prevent damage. Do not remove ICs from this foam during their storage. Avoid removing ICs from this foam, placing them on plastic which is likely to be charged with static electricity or inserting them into styrol foam.
2. High voltages may be applied during soldering caused by leakages from the soldering iron, so be sure to ground the tip of the soldering iron or use a low voltage soldering iron.
3. The human body, clothes made of synthetic fibers or nylon gloves may be charged with several thousands volts of static electricity because of friction, so a worker should be grounded.
4. Be sure to grounded measuring instruments such as oscilloscopes ,VTVMs, etc. used for repairs.

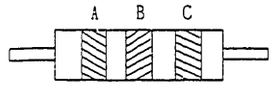
How to read capacity and inductance of resistor shape capacitors and coils

CAPACITOR



CAPACITY: (10A+B) × C (PF)
TOLERANCE : D
RATED VOLTAGE : BODY COLOR
PINK : 25V
GREEN : 50V
CHARACTERISTIC : E

COIL



INDUCTANCE: (10A+B) × C (μH)

COLOR	A.B	C	D	E
Black	0	10^0	±20%	For temperature compensation
Brown	1	10^1		
Red	2	10^2		
Orange	3	10^3		
Yellow	4	10^4		
Green	5	10^5		
Blue	6			
Violet	7			
Gray	8		±30%	High dielectric constant type
White	9			For temperature compensation
Gold		10^{-1}	±5%	
Silver		10^{-2}	±10%	High dielectric type

SERVICE MANUAL ABBREVIATION LIST

A	
A.DUB	Audio Dub
ACC	Automatic Color Control
ACK	Automatic Color Killer
ADD	Adder
AFC	Automatic Frequency Control
AGC	Automatic Gain Control
ALC	Automatic Level Control
ASBL	Assemble (Phase Matching)
APC	Automatic Phase Control
AUX	Auxiliary
B	
BATT.	Battery
BG	Burst Gate or Back Ground
BGP	Burst Gate Pulse
BH	Power Supply for Selecting VHF High Band
BL	Power Supply for Selecting VHF Low Band
BPF	Band-pass Filter
BS	Power Supply for Selecting VHF Super Band
BU	Power Supply for Selecting UHF Band
BUF.	Buffer Amplifier
C	
C	Chroma
C.FG/CFG	Capstan Frequency Generater
C.MEMORY	Counter Memory
C.PAUSE	Camera Pause
C.RESET	Counter Reset
C.REVERSE	Count Reverse
C.SYNC	Composite Synchronizing Signal
C/R	Capacitor/Resistor
CATV	Cable TV
CAPST.	Capstan
CCD	Charge Coupled Device
CH	Channel
CNR	Chroma Noise Reducer
CHAR.	Character
COM.	Common
COMP-EXP	Compressor-Expander
COMPA	Comparator
COMPE	Compensator
COM.	Composite
CONV.	Converter
CORR.	Correlation
COUNT.	Counter
CST	Cassette
CTL	Control Track Pulse
CYL.	Cylinder
D	
D/A	Digital to Analog
D/W	Dark/White
DA	Double Azimuth
DEEMPH.	Deemphasis
DEMOD.	Demodulator
DET	Detector
DISCRI.	Discriminator
DISP.	Display
DL	Delay line
DN	Down
DO	Dropout
DOC	Dropout Compensator
E	
E-E	Electronic-to-Electronic
EA-ROM	Electrically Alterable Read Only Memory
EMPH	Emphasis
EQ	Equalizer
EXT.	External
F	
FF	Flip Flop
F.FWD	Fast Forward
FG	Frequency Generator
FM	Frequency Modulation
FRAME ADV./F.ADV	Frame Advance
fsc	Color Sub Carrier Frequency
FWD	Forward
G	
GEN	Generator
GND	Ground
H	
HD	Horizontal Drive
Hi-Fi	High Fidelity
HPF	High-pass Filter
HPL	High-pass Limiter
HSS	Horizontal Sync. Separator
I	
I/O	In/Out (Input/Output)
IF	Intermediate Frequency
INDI.	Indicator
INT.	Internal
INV.	Inverter
IR	Infrared Rays
IRT	Instant Recording Timer
L	
LCD	Liquid Crystal Display
LIN.	Linear
LNC	Line Noise Canceller
LM	Loading Motor
LOG.	Logaritha
LPF	Low-pass Filter
L/R	Left/Right
LP	Long play
M	
M.CUT	Monitor Cut
M.STATE	Mechanism State
M.STOP	Memory Stop
MEM.	Memory
MIX	Mixer
MM	Monostable Multivibrator
MOD.	Modulator
MPX	Multiplex
MTS	Multi Channel Television Sound
N	
NF	Negative Feed Back
NORM.or NOR.	Normal
NR	Noise Reduction

O	
OSC	Oscillator
OSD	On-Screen Display
P	
PB/PLAY	Playback
PIF	Picture Intermediate Frequency
PLL	Phase Locked Loop
POS.	Positive
POWER CONT.	Power Control
PROG.	Program
PROTECT.	Protector
PWM	Pulse Width Modulation
R	
REC	Record
RECT.	Rectifier
REF	Reference
REG	Regulator
REV	Reverse
REW	Rewind
RF	Radio Frequency
RAM	Randum Access Memorey
ROM	Read Only Memory
S	
S/H	Sample and Hold
S.REEL	Supply Reel Sensor
S.TRACK.	Slow Tracking
S-VHS	Super VHS
SAW	Sawtooth
SAP	Second Audio Program
SEP.	Separator
SIF	Sound Intermediate Frequency
SP	Standard Play
SRCH	Search
SRV	Servo
SW 25Hz	Head Switching Pulse
SYNC	Synchronizing Signal
SYS.CON	System Control
T	
T/L	Tuner/Line
T.BRAKE	Take-up Brake
Tμp	Timer Microprocessor
T.REEL	Take-up Reel Sensor
T.RESET	Timer Reset
TP	Test Point
TRS	Transfer
TU-μP	Tuning Microprocessor
U	
U/D	Up/Down
UNI.	Unified
V	
V-REF	Voltage Reference
V.DRV	Vertical Drive Pulse
V.DUB	Video Dub
VAR.	Variable
VCA	Voltage Controlled Amplitier
VCO	Voltage Controlled Oscillator
VHS	Video Home Systems

Vss	Voltage Super Source
VOL.	Volume
VSS	Vertical Sync. Separator
VT	Tuning Voltage
VT-U	Tuning Voltage-UHF
VT-V	Tuning Voltage-VHF
W	
WE	Weighting
Y	
Y/C	Luminance/Chrominance

DIGITAL PROCESS CIRCUIT

A	
ADC B-Y	Analog to Digital Converted B-Y Signal
ADC R-Y	Analog to Digital Converted R-Y Signal
ADC Y	Analog to Digital Converted Luminance
ADRS	Address
C	
CAS	Column Address Strobe
C.BLANK	Chroma Blanking
D	
DRAM	Dynamic Random Access Memory
DEMPX	Demultiplexer
DWC	Delayed Write Clock
DT/OE	Data Transfer /Output Enable
D.REF 25	Delayed Reference 25Hz
D.SW 25	Delayed Switching 25Hz
I	
INC	Row Counter Increment
M	
MEM	Memory
MEM VIDEO	Memorized Video
MEM SW	Memory Switch
MEM ON	Memory ON
MPX	Multiplexer
MPX VIDEO	Multiplexed Video
O	
O/E	Odd/Even Field
P	
P IN P	Picture in Picture
PIX MOVE	Picture Move
R	
RC	Reading Clock
RCC	Reading Clock Clear
RCR	Row Counter Reset
RAS	Row Address Strobe
REF 25	Reference 25Hz from servo circuit
REL	Refresh Control
S	
SC	Serial Control
W	
WC	Write Clock
WCC	Write Clock Clear
WRITE ENBL (WE)	Write Enable

SEMICONDUCTOR CONFIGURATION

When replacing a semiconductor, take care of its pin numbers and makings (recess, paint) so as not to insert it in reverse.

TRANSISTOR

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		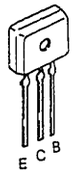	
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	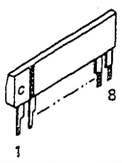	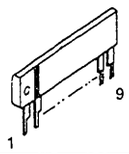	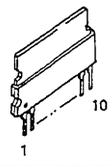	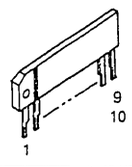
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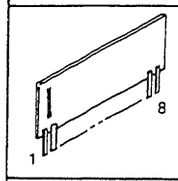	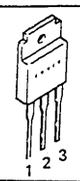
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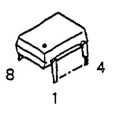	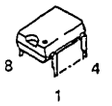	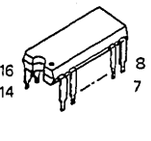	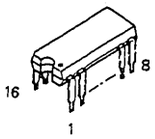	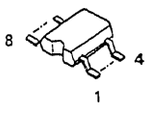
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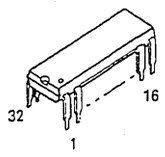	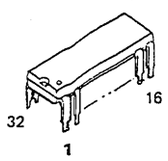	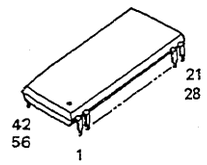	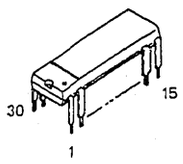
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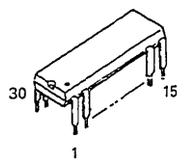	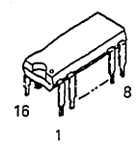	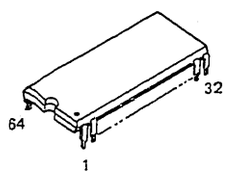	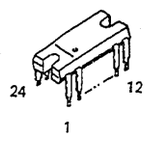
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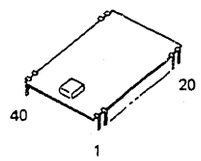
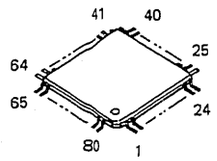
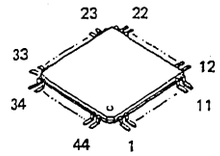
			
HT7263	XRA7703KP μPD75516 PST520C	JCP0006	

INTERNAL WIRING DIAGRAM

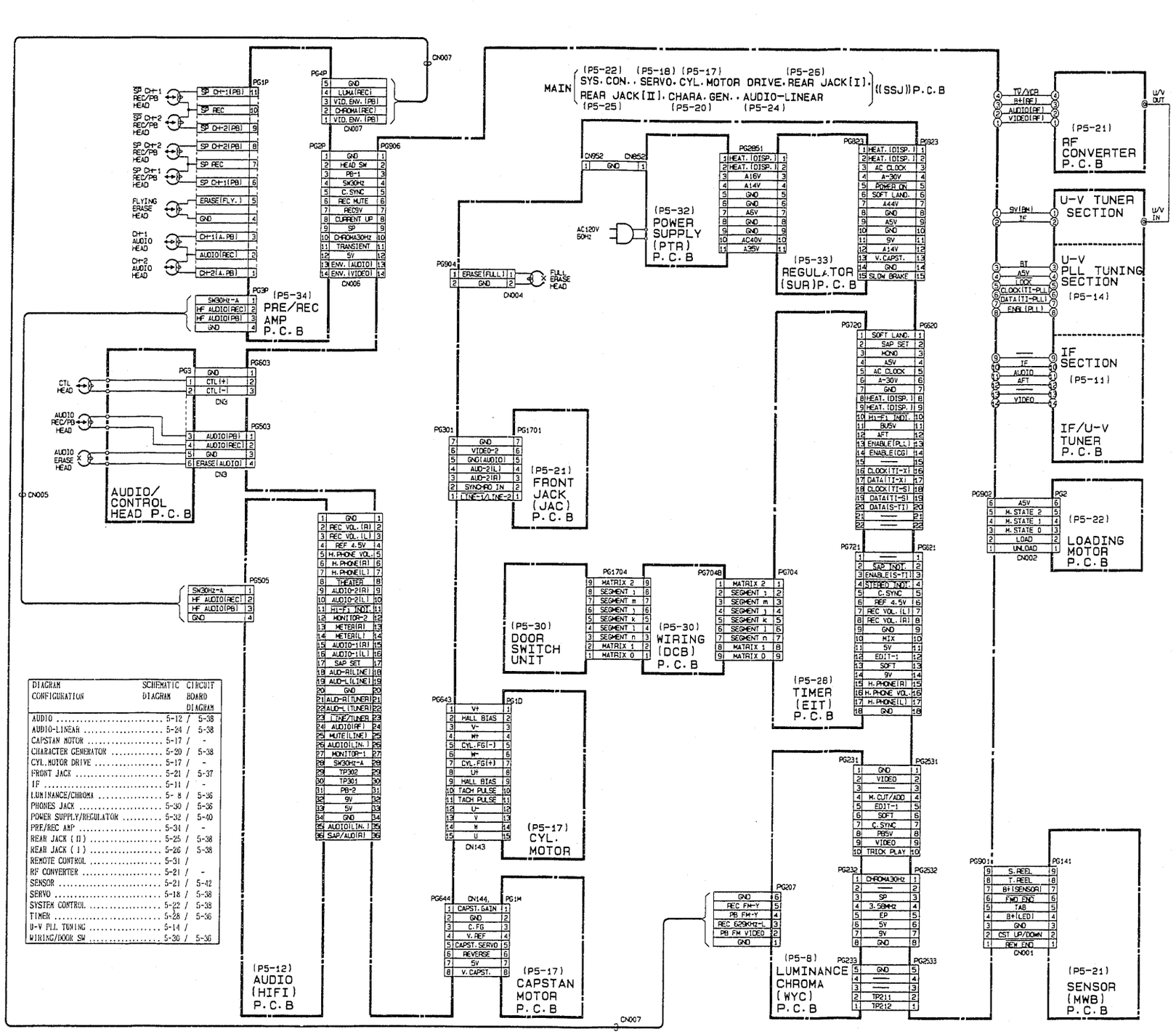


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
AUDIO	5-12 /	5-38
AUDIO-LINEAR	5-24 /	5-38
CAPSTAN MOTOR	5-17 /	-
CHARACTER GENERATOR	5-20 /	5-38
CYL.MOTOR DRIVE	5-17 /	-
FRONT JACK	5-21 /	5-37
IF	5-11 /	-
LUMINANCE/CHROMA	5- 8 /	5-36
PHONES JACK	5-30 /	5-36
POWER SUPPLY/REGULATOR	5-32 /	5-40
PRE/REC AMP	5-31 /	-
REAR JACK (II)	5-25 /	5-38
REAR JACK (I)	5-26 /	5-38
REMOTE CONTROL	5-31 /	
RF CONVERTER	5-21 /	-
SENSOR	5-21 /	5-42
SERVO	5-18 /	5-38
SYSTEM CONTROL	5-22 /	5-38
TIMER	5-28 /	5-36
U-V PLL TUNING	5-14 /	
WIRING/DOOR SW	5-30 /	5-36

LUMINANCE/CHROMA SCHEMATIC DIAGRAM

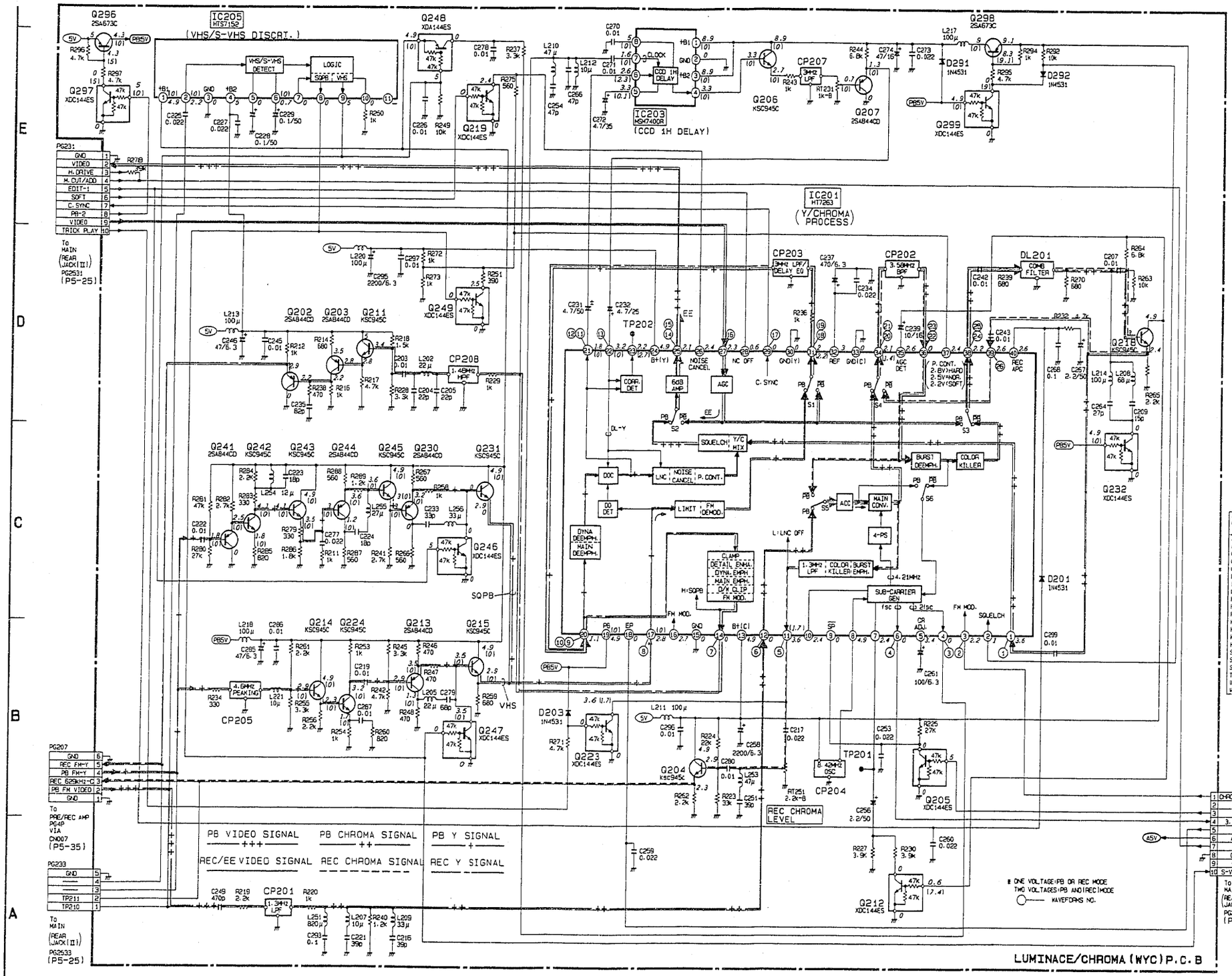


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
AUDIO	5-12	5-36
AUDIO LINEAR	5-24	5-36
CAPSTAN MOTOR	5-17	-
CHARACTER GENERATOR	5-20	5-36
CTL.MOTOR DRIVE	5-17	-
FRONT JACK	5-21	5-37
IF	5-11	-
LUMINANCE/CHROMA	5- 8	5-36
PHONES JACK	5-30	5-36
POWER SUPPLY/REGULATOR	5-32	5-40
PRE/REC AMP	5-34	-
REAR JACK (II)	5-25	5-36
REAR JACK (I)	5-26	5-38
REMOTE CONTROL	5-31	-
RF CONVERTER	5-21	-
SENSOR	5-21	5-42
SERVO	5-18	5-38
SYSTEM CONTROL	5-22	5-38
TIMER	5-28	5-36
U-V PLL TUNING	5-14	-
WIRING/BARR SW	5-30	5-36

LUMINANCE/CHROMA WAVEFORMS

1 IC201-1 200mVp-p 50mV/20.0μ sec.cm PLAY	2 IC201-3 4.5Vp-p 1V/10.0m sec.cm REC/PLAY	3 IC201-4 320mVp-p 0.1V/100n sec.cm REC/PLAY	4 IC201-6 520mVp-p 0.1V/200n sec.cm REC/PLAY	5 IC201-11 250mVp-p 50mV/20.0μ sec.cm REC
6 IC201-12 190mVp-p 50mV/20.0μ sec.cm PLAY	7 IC201-14 700mVp-p 0.2V/20.0μ sec.cm REC	8 IC201-17 200mVp-p 50mV/20.0μ sec.cm PLAY	9 IC201-20 450mVp-p 0.1V/20.0μ sec.cm REC	10 IC201-20 350mVp-p 0.1V/20.0μ sec.cm PLAY
11 IC201-21 440mVp-p 0.1V/20.0μ sec.cm REC	12 IC201-21 600mVp-p 0.1V/20.0μ sec.cm PLAY	13 IC201-22 600mVp-p 0.2V/20.0μ sec.cm PLAY	14 IC201-25 1.8Vp-p 0.5V/20.0μ sec.cm REC	15 IC201-25 2.2Vp-p 0.5V/20.0μ sec.cm PLAY
16 IC201-27 1.0Vp-p 0.2V/20.0μ sec.cm REC	17 IC201-29 4.6Vp-p 1V/20.0μ sec.cm REC/PLAY	18 IC201-31 900mVp-p 0.2V/20.0μ sec.cm REC	19 IC201-31 800mVp-p 0.2V/20.0μ sec.cm PLAY	20 IC201-34 300mVp-p 0.1V/20.0μ sec.cm REC
21 IC201-34 400mVp-p 0.1V/20.0μ sec.cm PLAY	22 IC201-36 240mVp-p 50mV/20.0μ sec.cm REC	23 IC201-36 130mVp-p 50mV/20.0μ sec.cm PLAY	24 IC201-38 900mVp-p 0.2V/20.0μ sec.cm REC	25 IC201-38 900mVp-p 0.2V/20.0μ sec.cm PLAY
26 IC201-39 150mVp-p 50mV/20.0μ sec.cm REC				

IF SCHEMATIC DIAGRAM

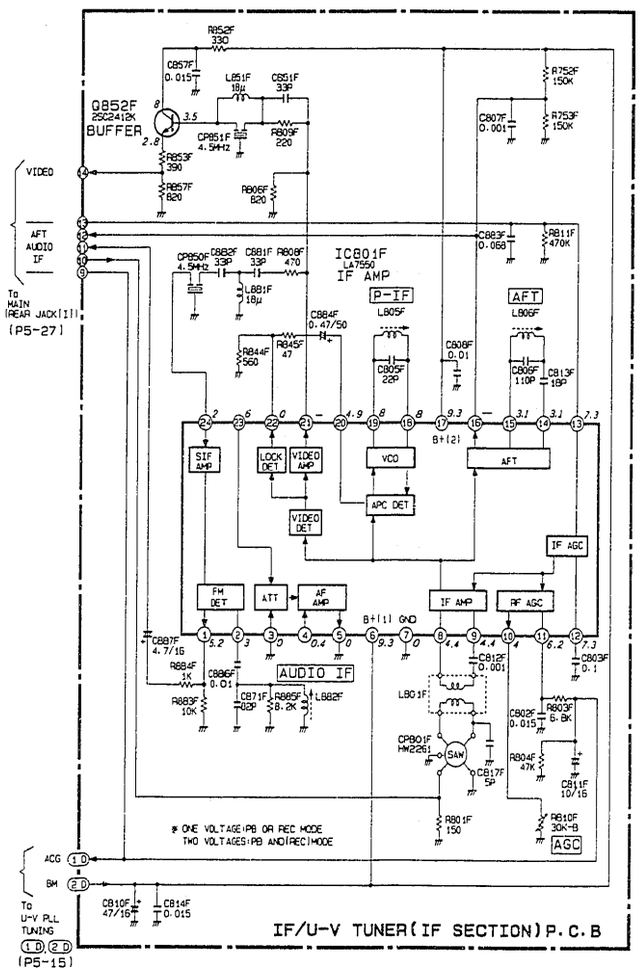
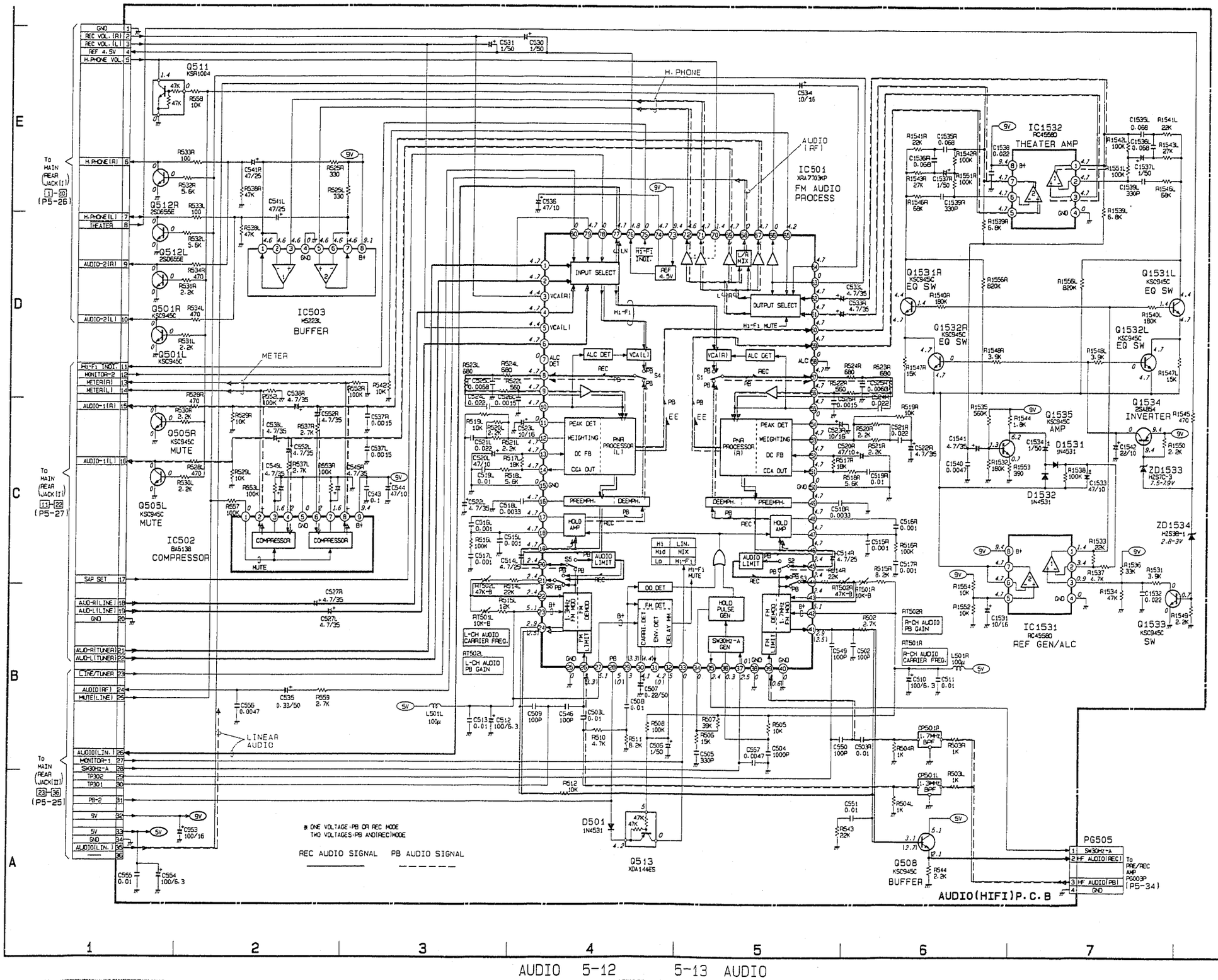
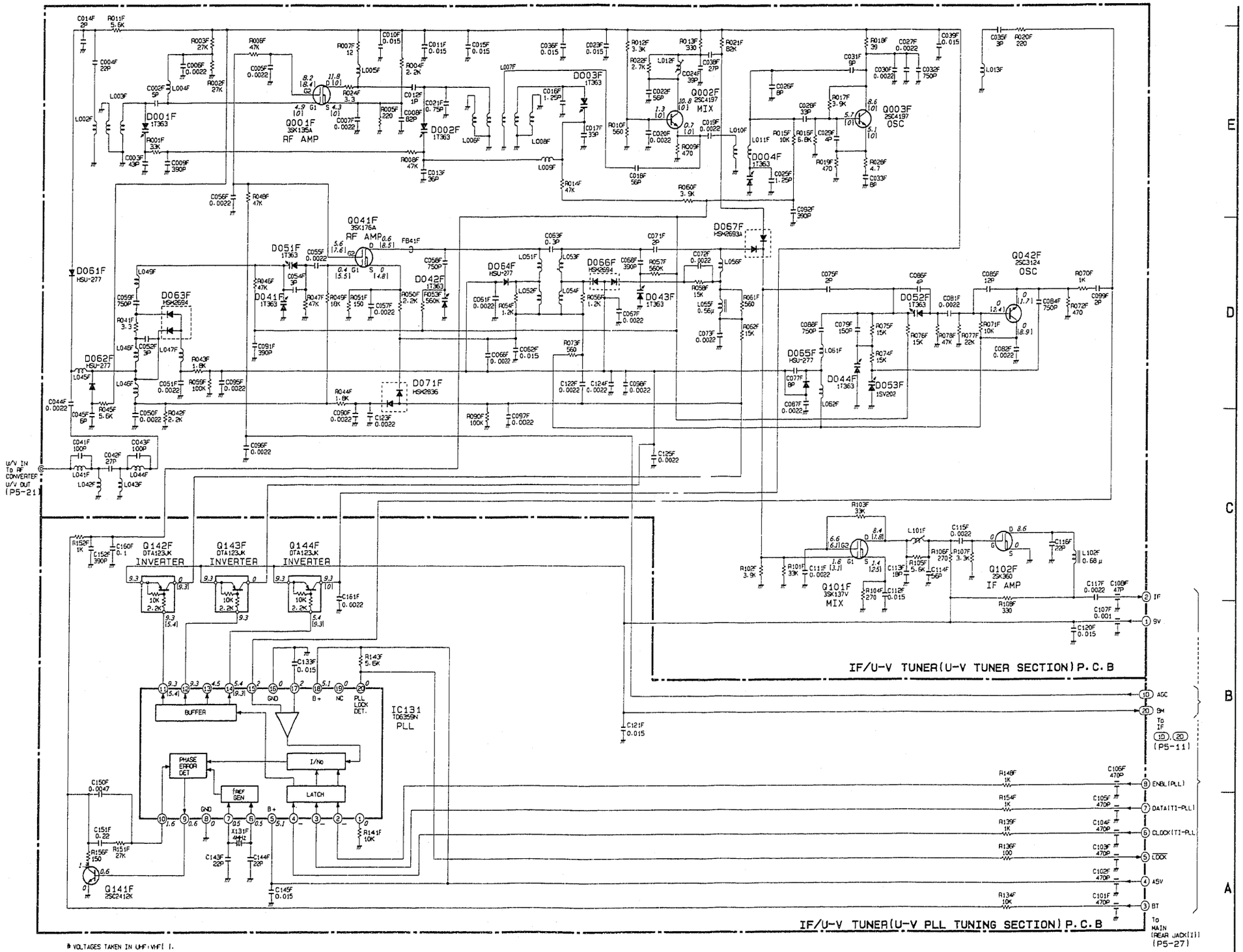


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
AUDIO	5-12 /	5-38
AUDIO-LINEAR	5-24 /	5-38
CAPSTAN MOTOR	5-17 /	-
CHARACTER GENERATOR	5-20 /	5-38
CYL.MOTOR DRIVE	5-17 /	-
FRONT JACK	5-21 /	5-37
IF	5-11 /	-
LUMINANCE/CHROMA	5- 8 /	5-36
PHONES JACK	5-30 /	5-36
POWER SUPPLY/REGULATOR	5-32 /	5-40
PRE/REC AMP	5-34 /	-
REAR JACK (II)	5-25 /	5-38
REAR JACK (I)	5-26 /	5-38
REMOTE CONTROL	5-31 /	
RF CONVERTER	5-21 /	-
SENSOR	5-21 /	5-42
SERVO	5-18 /	5-38
SYSTEM CONTROL	5-22 /	5-39
TIMER	5-28 /	5-36
U-V PLL TUNING	5-14 /	
WIRING/DOOR SW	5-30 /	5-36

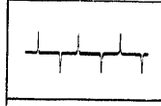
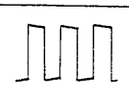
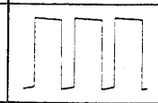
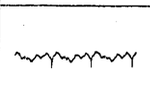
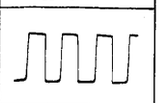
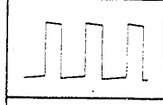
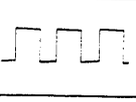
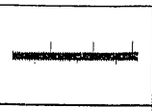
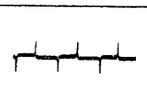
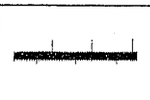
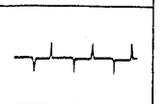
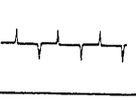
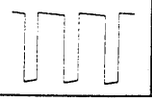
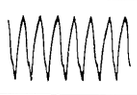
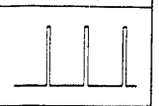
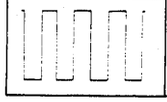
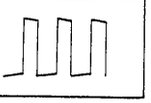
AUDIO SCHEMATIC DIAGRAM



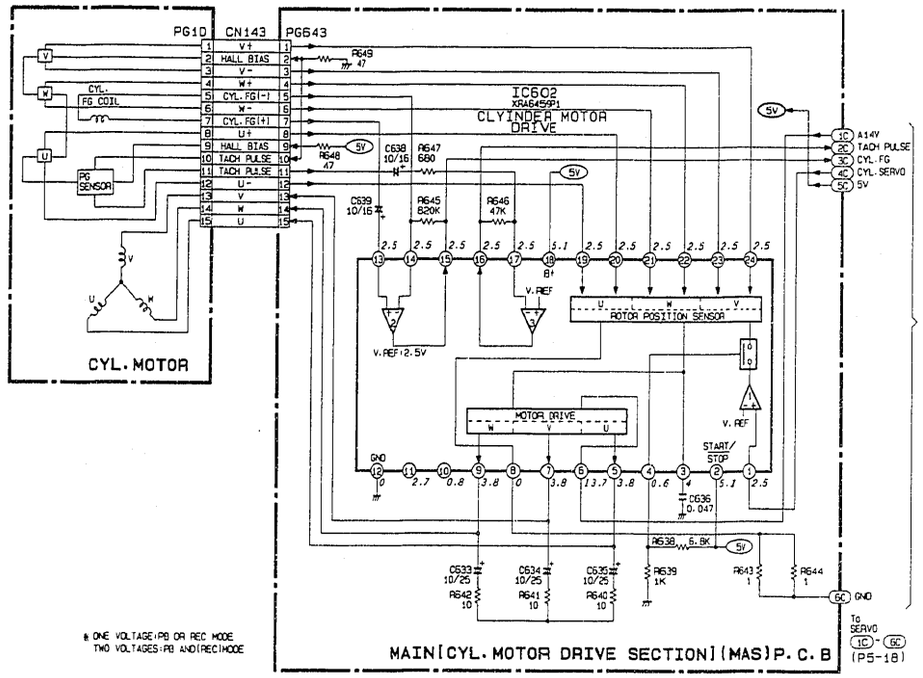
U-V PLL TUNING SCHEMATIC DIAGRAM



SERVO WAVEFORMS

51-A TP604 1.9Vp-p 0.5V/10.0msec.cm ✱REC/PLAY	52-A TP606 5.4Vp-p 1V/10.0msec.cm REC/PLAY	54-A IC601-1 5.8Vp-p 2V/10.0msec.cm REC/PLAY	55-A IC601-6 2.8Vp-p 0.5V/2.0msec.cm REC/PLAY	56-A IC601-7 2.3Vp-p 0.5V/10.0msec.cm REC/PLAY	57-A IC601-9 4.0Vp-p 1V/1.0msec.cm REC/PLAY
					
58-A IC601-29 6.5Vp-p 2V/10.0msec.cm REC	59-A IC601-30 2.6Vp-p 1V/10.0msec.cm REC	60-A IC601-34 ø80mVp-p 0.2V/10.0msec.cm REC	60-B IC601-34 2.2Vp-p 1V/10.0msec.cm PLAY	61-A IC601-35 660mVp-p 0.2V/10.0msec.cm REC	61-B IC601-35 2.1Vp-p 1V/10.0msec.cm PLAY
					
62-A IC601-36 ø60mVp-p 0.2V/10.0msec.cm REC	62-B IC601-36 2.2Vp-p 1V/10.0msec.cm PLAY	63-A IC601-39 5.6Vp-p 1V/10.0msec.cm REC/PLAY	64-A IC601-42 510mVp-p 0.1V/200μsec.cm REC/PLAY	65-A IC601-45 5.8Vp-p 1V/10.0msec.cm REC/PLAY	66-A IC601-50 5.2Vp-p 1V/20.0μsec.cm REC/PLAY
					
67-A IC601-55 5.7Vp-p 1V/500μsec.cm REC/PLAY	68-A IC601-56 5.4Vp-p 1V/10.0msec.cm REC/PLAY				
					

CYL. MOTOR DRIVE SCHEMATIC DIAGRAM



CAPSTAM MOTOR SCHEMATIC DIAGRAM

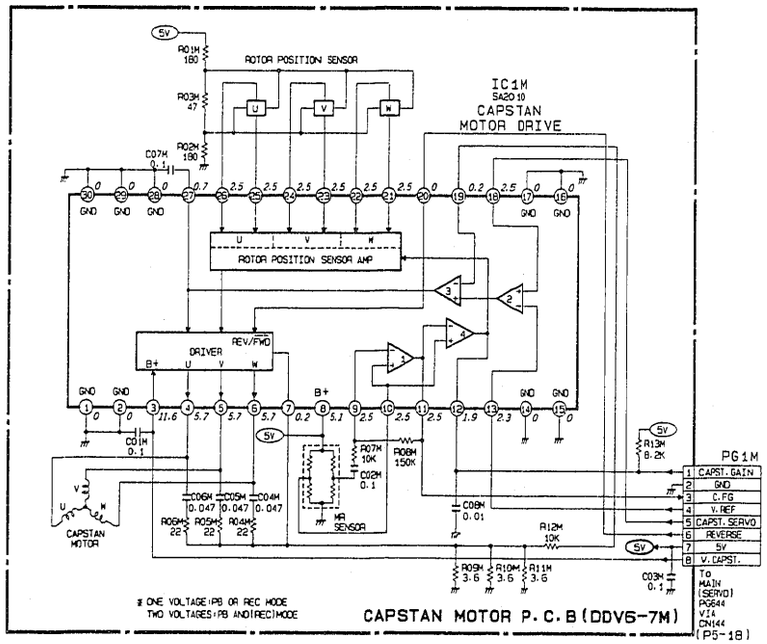


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
AUDIO	5-12 /	5-33
AUDIO-LINEAR	5-24 /	5-38
CAPSTAN MOTOR	5-17 /	-
CHARACTER GENERATOR	5-20 /	5-36
CYL.MOTOR DRIVE	5-17 /	-
FRONT JACK	5-21 /	5-37
IF	5-11 /	-
LUMINANCE/CHROMA	5- 8 /	5-36
PHONES JACK	5-30 /	5-36
POWER SUPPLY/REGULATOR	5-32 /	5-40
PRE/REC AMP	5-34 /	-
REAR JACK (II)	5-25 /	5-38
REAR JACK (I)	5-26 /	5-38
REMOTE CONTROL	5-31 /	
RF CONVERTER	5-21 /	-
SENSOR	5-21 /	5-42
SERVO	5-18 /	5-38
SYSTEM CONTROL	5-22 /	5-38
TIMER	5-28 /	5-36
U-V PLL TUNING	5-14 /	
WIRING/DOOR SW	5-30 /	5-36

SERVO SCHEMATIC DIAGRAM

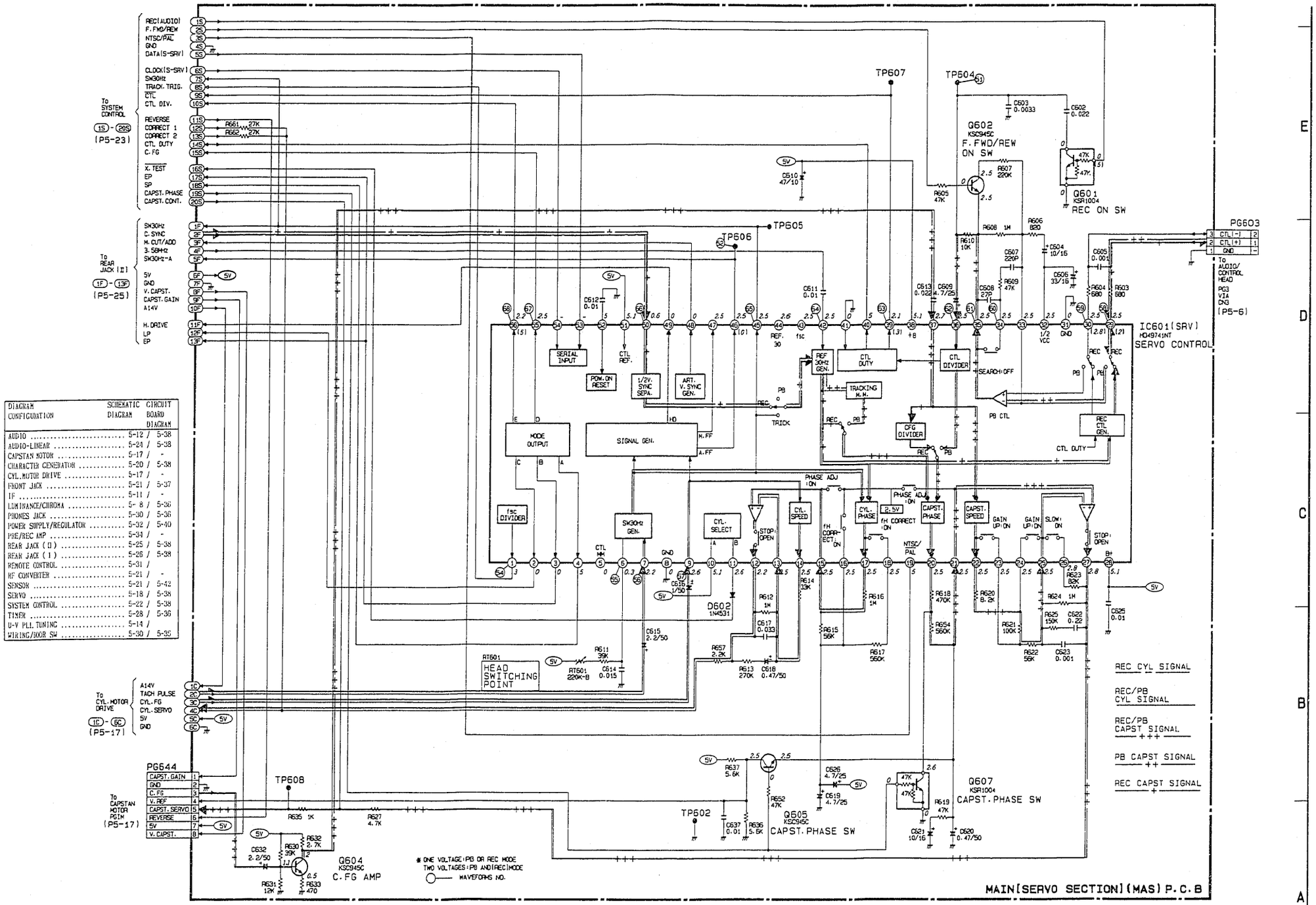
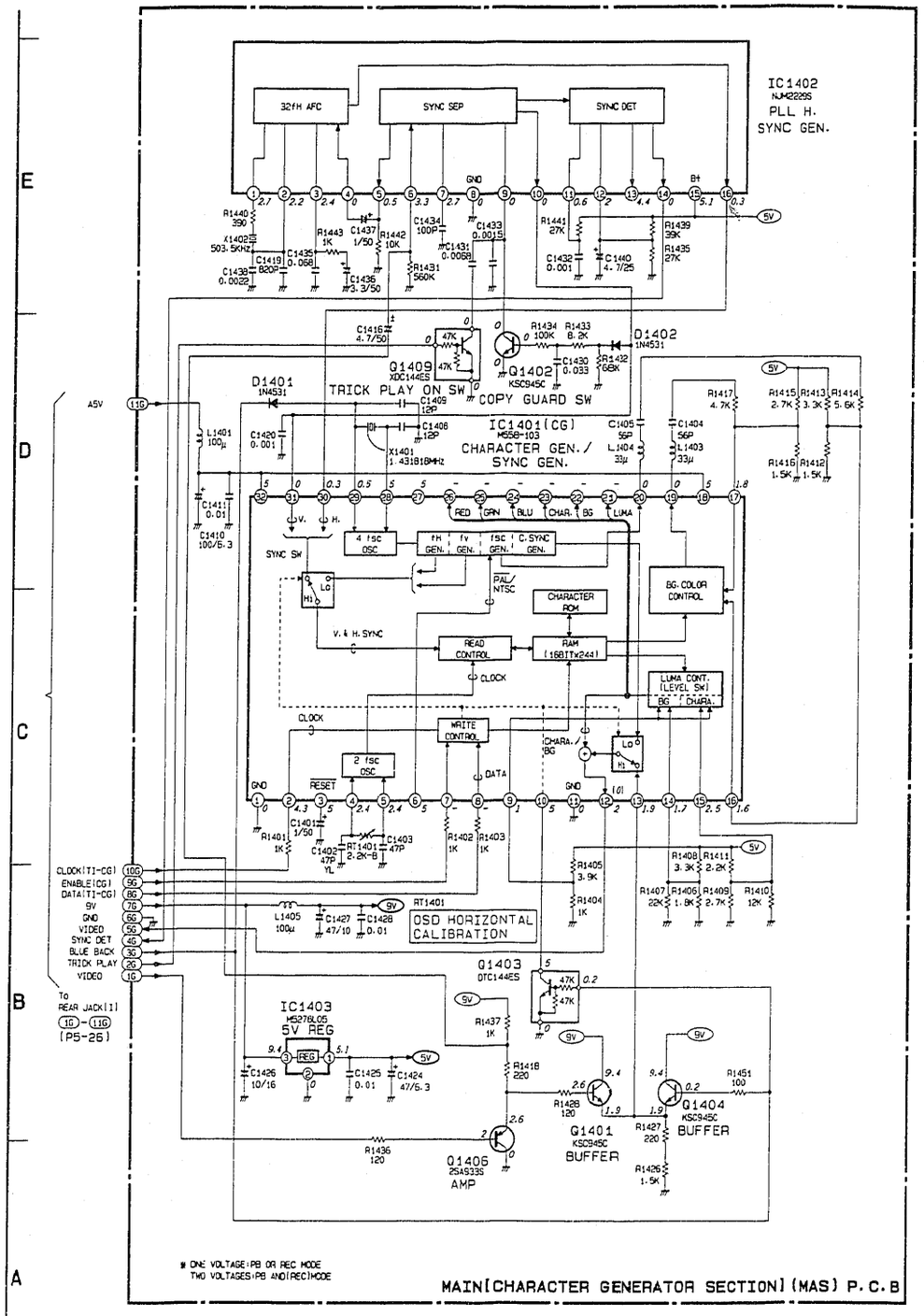
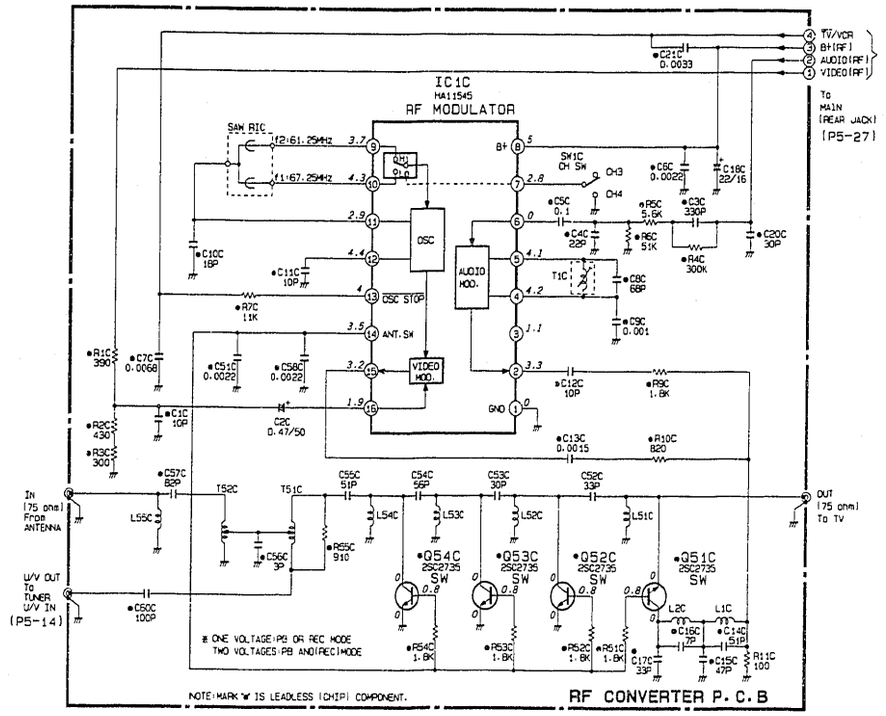


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
AUDIO	5-12 /	5-38
AUDIO-LINEAR	5-24 /	5-38
CAPSTAN MOTOR	5-17 /	-
CHARACTER GENERATOR	5-20 /	5-38
CYL.MOTOR DRIVE	5-17 /	-
FRONT JACK	5-21 /	5-37
IF	5-11 /	-
LUMINANCE/CHROMA	5- 8 /	5-36
PHONES JACK	5-30 /	5-36
POWER SUPPLY/REGULATOR	5-32 /	5-40
PRE/REC AMP	5-34 /	-
REAR JACK (II)	5-25 /	5-38
REAR JACK (I)	5-26 /	5-38
REMOTE CONTROL	5-31 /	
RF CONVERTER	5-21 /	-
SENSOR	5-21 /	5-42
SERVO	5-18 /	5-38
SYSTEM CONTROL	5-22 /	5-38
TIMER	5-28 /	5-36
U-V PLL TUNING	5-14 /	
WIRING/DOOR SW	5-30 /	5-35

CHARACTER GENERATOR SCHEMATIC DIAGRAM



RF CONVERTER SCHEMATIC DIAGRAM



FRONT JACK SCHEMATIC DIAGRAM

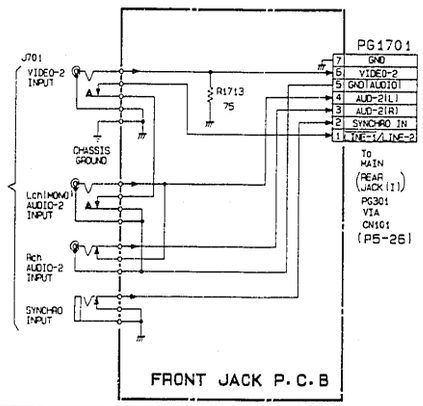
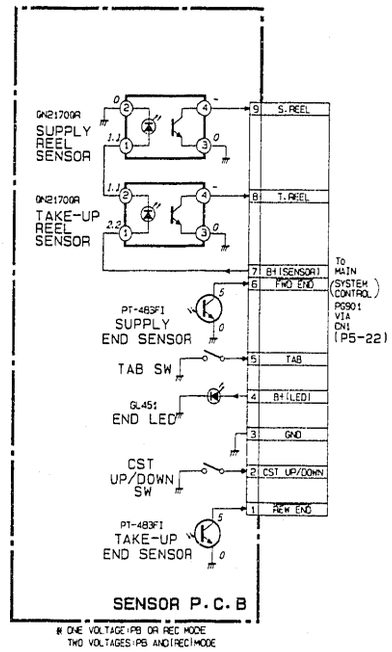


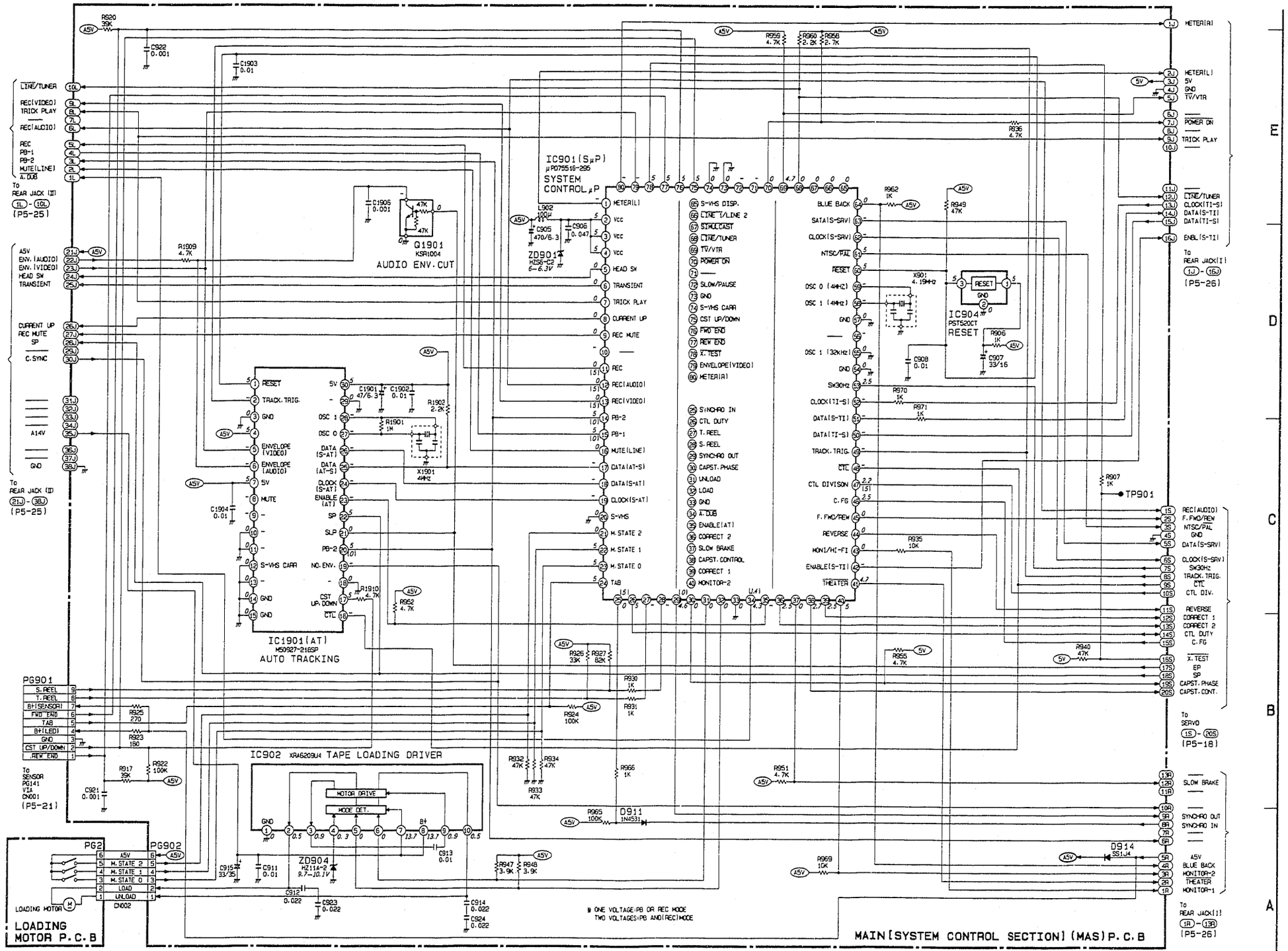
DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
AUDIO	5-12 /	5-38
AUDIO-LINEAR	5-24 /	5-38
CAPSTAN MOTOR	5-17 /	-
CHARACTER GENERATOR	5-20 /	5-38
CYL.MOTOR DRIVE	5-17 /	-
FRONT JACK	5-21 /	5-37
IF	5-11 /	-
LUMINANCE/CHROMA	5- 8 /	5-36
PHONES JACK	5-30 /	5-36
POWER SUPPLY/REGULATOR	5-32 /	5-40
PRE/REC AMP	5-34 /	-

DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
REAR JACK (II)	5-25 /	5-38
REAR JACK (I)	5-26 /	5-38
REMOTE CONTROL	5-31 /	
RF CONVERTER	5-21 /	-
SENSOR	5-21 /	5-42
SERVO	5-18 /	5-38
SYSTEM CONTROL	5-22 /	5-38
TIMER	5-28 /	5-36
U-V PLL TUNING	5-14 /	
WIRING/EXCH SW	5-30 /	5-36

SENSOR SCHEMATIC DIAGRAM



SYSTEM CONTROL SCHEMATIC DIAGRAM



SYSTEM CONTROL 5-22 5-23 SYSTEM CONTROL

AUDIO-LINEAR SCHEMATIC DIAGRAM

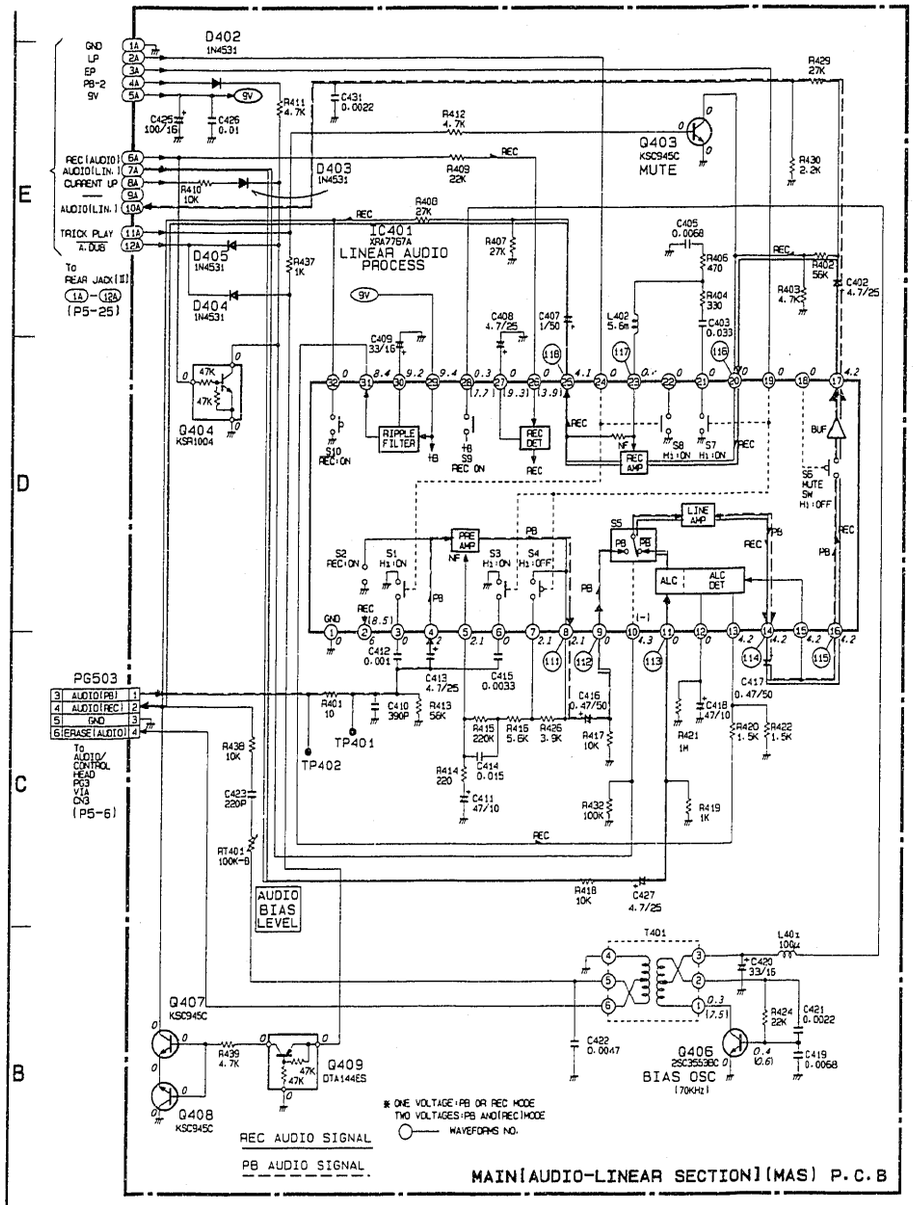
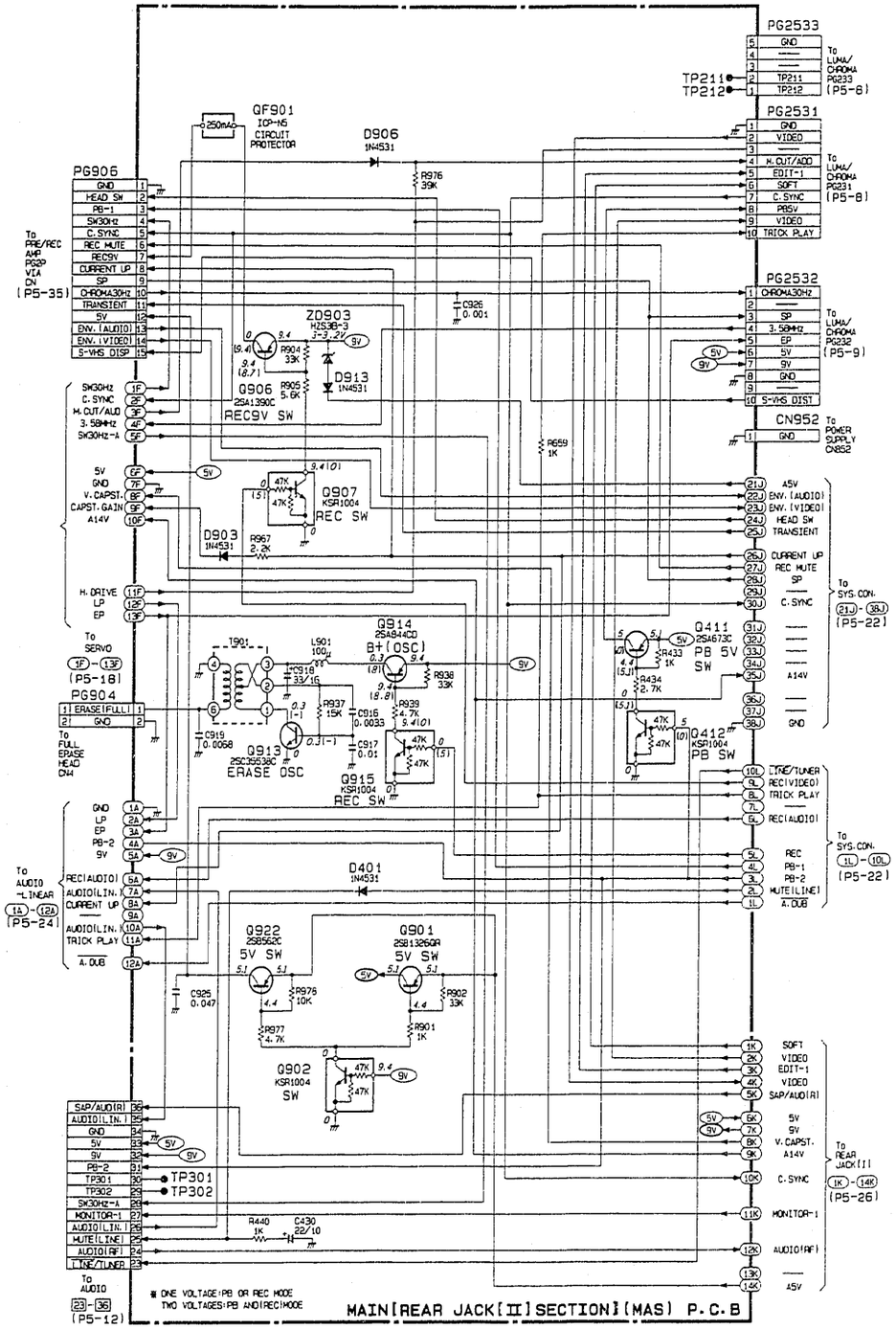
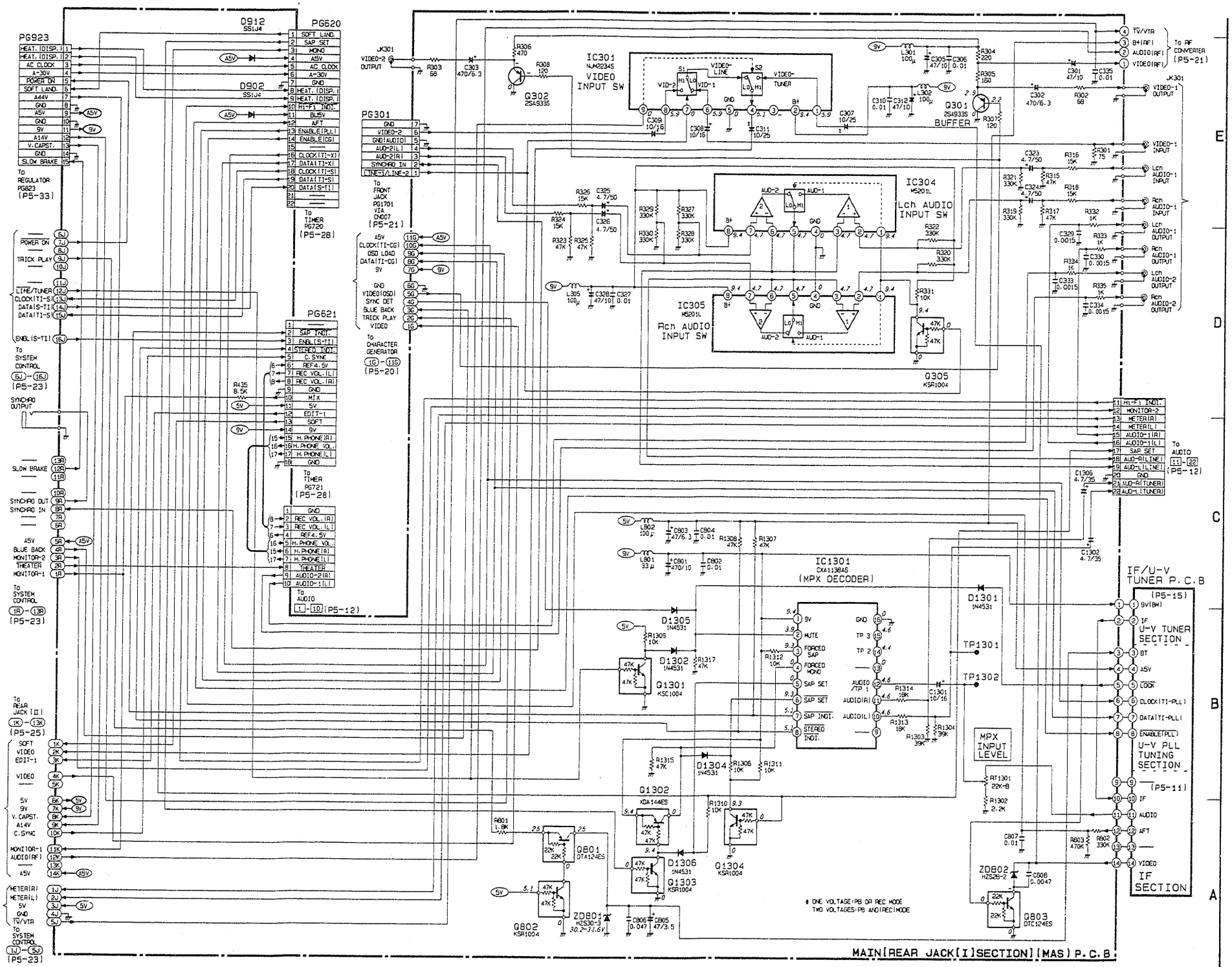


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM	DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
AUDIO	5-12	5-38	REAR JACK (II)	5-25	5-38
AUDIO-LINEAR	5-24	5-38	REAR JACK (I)	5-26	5-38
CAPSTAN MOTOR	5-17	-	REMOTE CONTROL	5-31	
CHARACTER GENERATOR	5-20	5-38	RF CONVERTER	5-21	-
CYL.MOTOR DRIVE	5-17	-	SENSOR	5-21	5-42
FRONT JACK	5-21	5-37	SERVO	5-18	5-38
IF	5-11	-	SYSTEM CONTROL	5-22	5-38
LUMINANCE/CHROMA	5- 8	5-36	TUNER	5-28	5-36
PHONES JACK	5-30	5-36	U-V PLL TUNING	5-14	
POWER SUPPLY/REGULATOR	5-32	5-40	WIRING/DOOR SW	5-30	5-36
PRE/REC AMP	5-34	-			

REAR JACK(II) SCHEMATIC DIAGRAM



REAR JACK[I] SCHEMATIC DIAGRAM



TIMER SCHEMATIC DIAGRAM

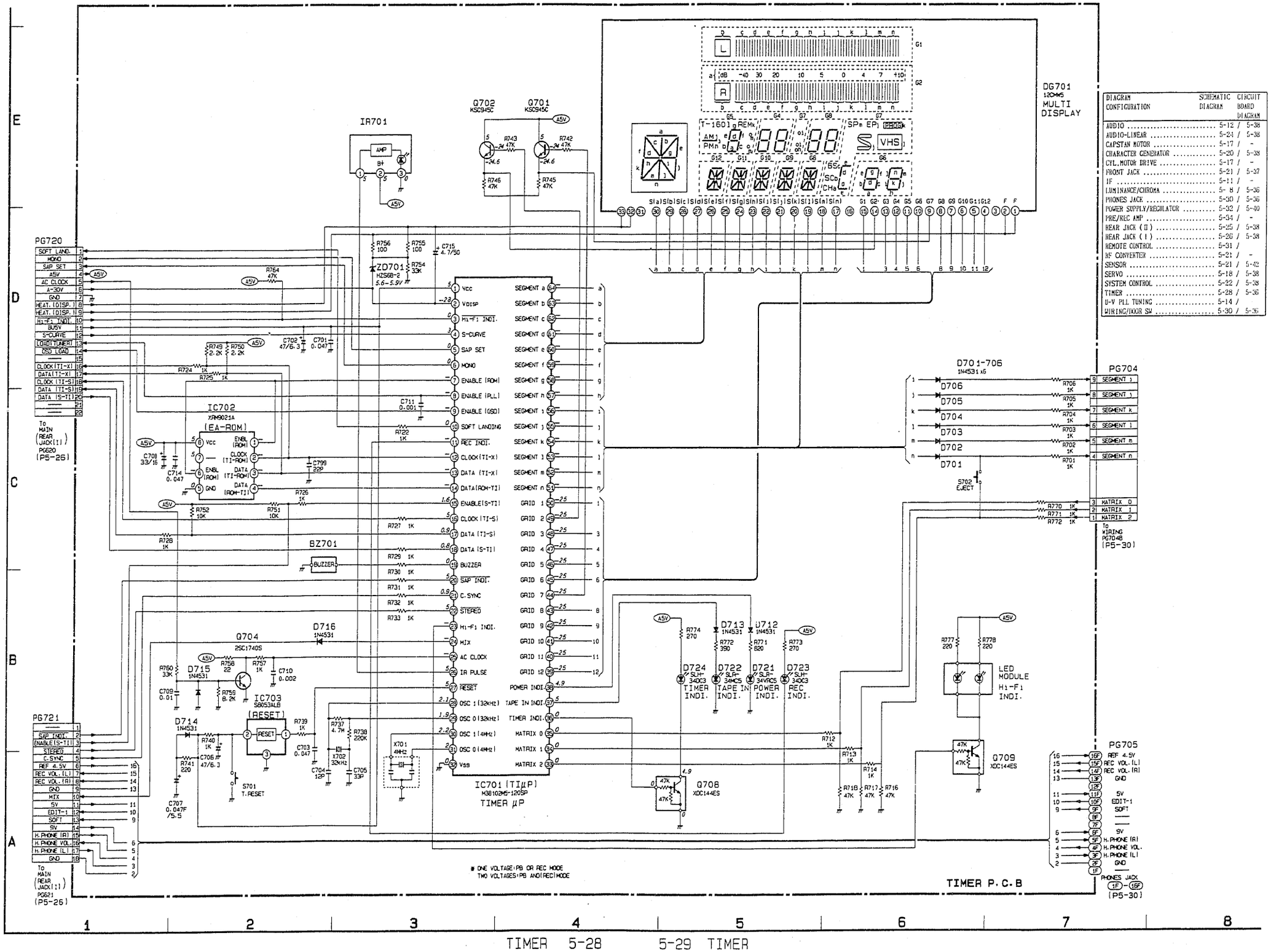
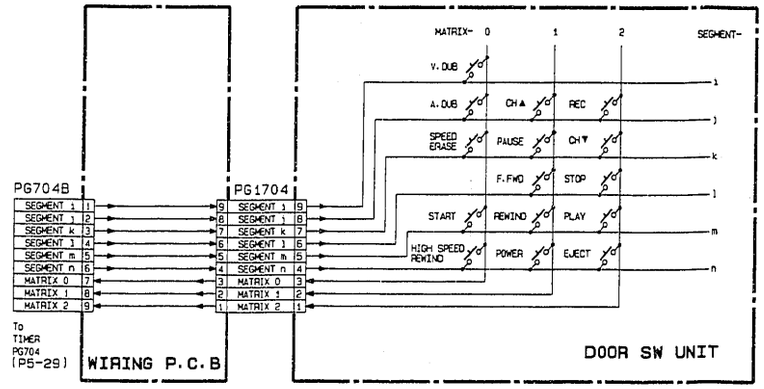


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
AUDIO	5-12 /	5-38
AUDIO-LINEAR	5-24 /	5-38
CAPSTAN MOTOR	5-17 /	-
CHARACTER GENERATOR	5-20 /	5-38
CYL.MOTOR DRIVE	5-17 /	-
FRONT JACK	5-21 /	5-37
IF	5-11 /	-
LUMINANCE/CHROMA	5- 8 /	5-36
PHONES JACK	5-30 /	5-36
POWER SUPPLY/REGULATOR	5-32 /	5-40
PRE/REC AMP	5-34 /	-
REAR JACK (II)	5-25 /	5-38
REAR JACK (I)	5-26 /	5-38
REMOTE CONTROL	5-31 /	
RF CONVERTER	5-21 /	-
SENSOR	5-21 /	5-42
SERVO	5-18 /	5-38
SYSTEM CONTROL	5-22 /	5-38
TIMER	5-28 /	5-36
U-V PLL TUNING	5-14 /	
WIRING/IKOR SW	5-30 /	5-36

WIRING/DOOR SW SCHEMATIC DIAGRAM



PHONES JACK SCHEMATIC DIAGRAM

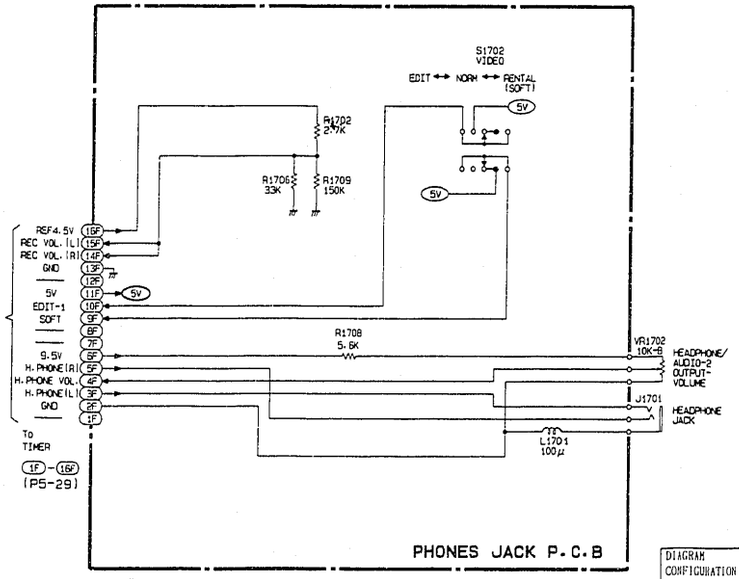
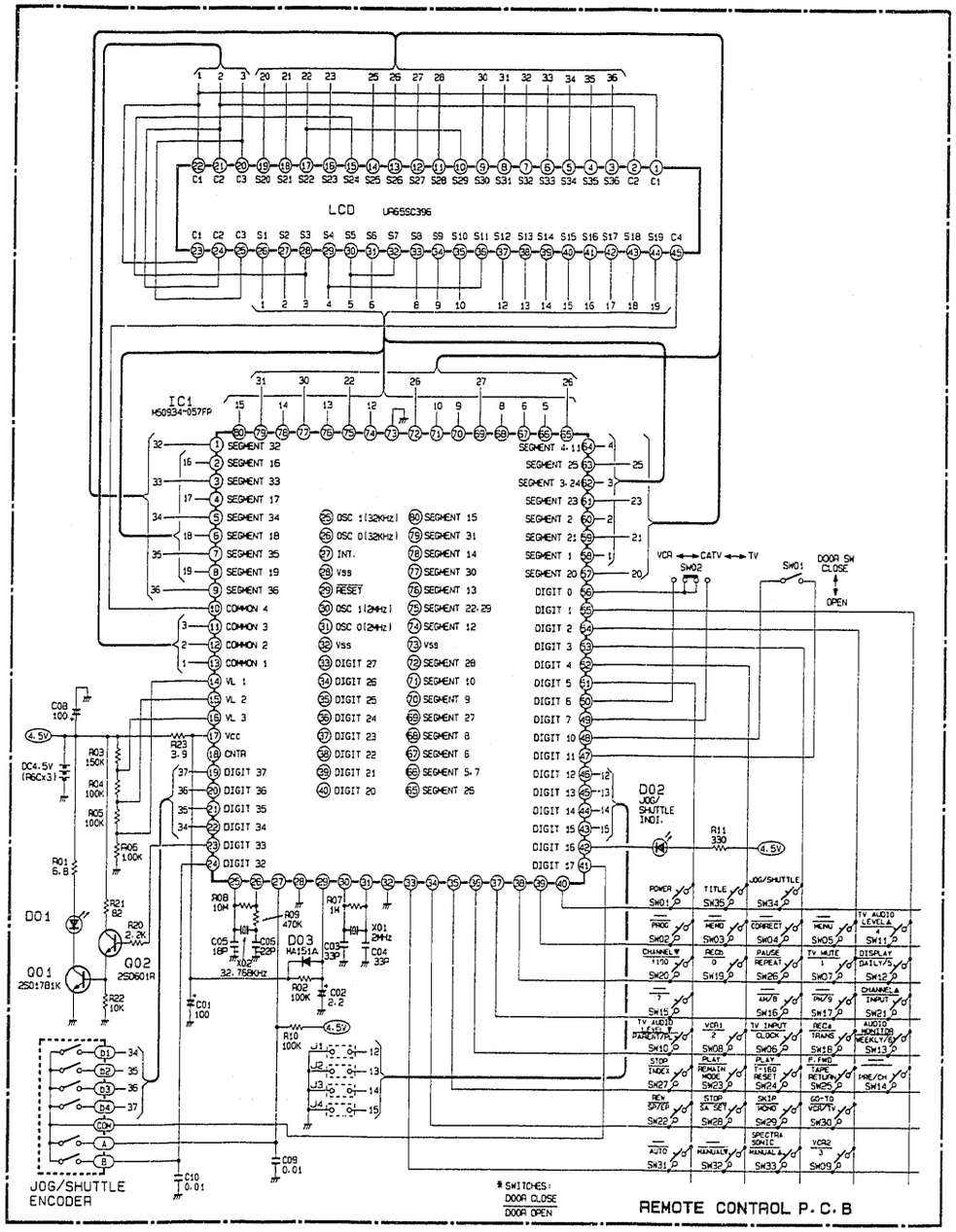


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
AUDIO	5-12 /	5-38
AUDIO-LINEAR	5-24 /	5-38
CAPSTAN MOTOR	5-17 /	-
CHARACTER GENERATOR	5-20 /	5-38
CYL. MOTOR DRIVE	5-17 /	-
FRONT JACK	5-21 /	5-37
IF	5-11 /	-
LUMINANCE/CHROMA	5- 8 /	5-36
PHONES JACK	5-30 /	5-36
POWER SUPPLY/REGULATOR	5-32 /	5-40
PRE/REC AMP	5-34 /	-
REAR JACK (II)	5-25 /	5-38
REAR JACK (I)	5-26 /	5-38
REMOTE CONTROL	5-31 /	
RF CONVERTER	5-21 /	-
SENSOR	5-21 /	5-42
SERVO	5-18 /	5-38
SYSTEM CONTROL	5-22 /	5-38
TIMER	5-28 /	5-36
U-V PLL TUNING	5-14 /	
WIRING/DOOR SW	5-30 /	5-36

REMOTE CONTROL SCHEMATIC DIAGRAM



POWER SUPPLY/REGULATOR SCHEMATIC DIAGRAM

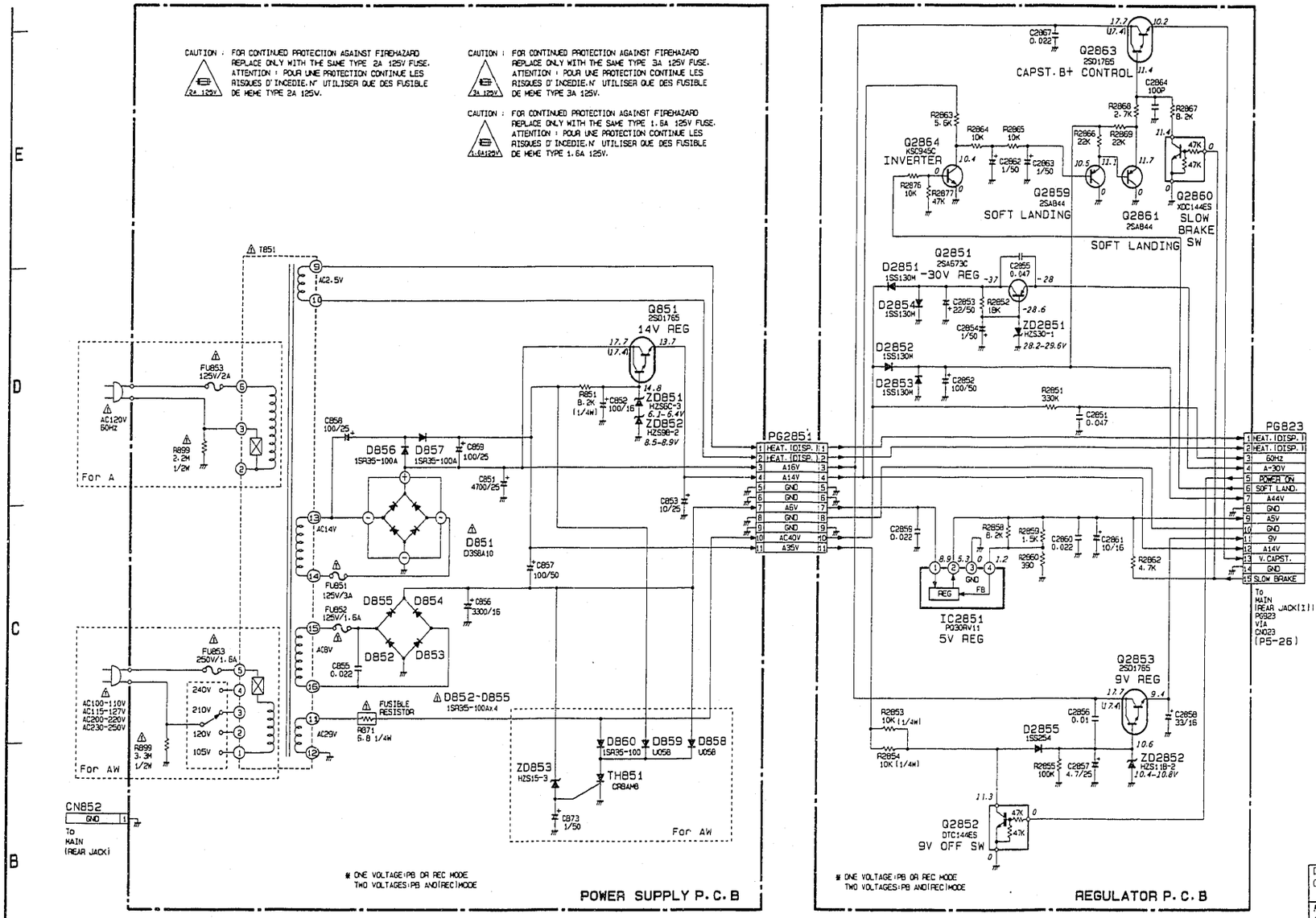


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
AUDIO	5-12 /	5-38
AUDIO-LINEAR	5-24 /	5-38
CAPSTAN MOTOR	5-17 /	-
CHARACTER GENERATOR	5-20 /	5-38
CYL.MOTOR DRIVE	5-17 /	-
FRONT JACK	5-21 /	5-37
IF	5-11 /	-
LUMINANCE/CHROMA	5- 8 /	5-36
PHONES JACK	5-30 /	5-36
POWER SUPPLY/REGULATOR	5-32 /	5-40
PRE/REC AMP	5-34 /	-
REAR JACK (II)	5-25 /	5-38
REAR JACK (I)	5-26 /	5-38
REMOTE CONTROL	5-31 /	
RF CONVERTER	5-21 /	-
SENSOR	5-21 /	5-42
SERVO	5-18 /	5-38
SYSTEM CONTROL	5-22 /	5-38
TIMER	5-28 /	5-36
U-V PLL TUNING	5-14 /	
WIRING/DOOR SW	5-30 /	5-36

PRE/REC AMP SCHEMATIC DIAGRAM

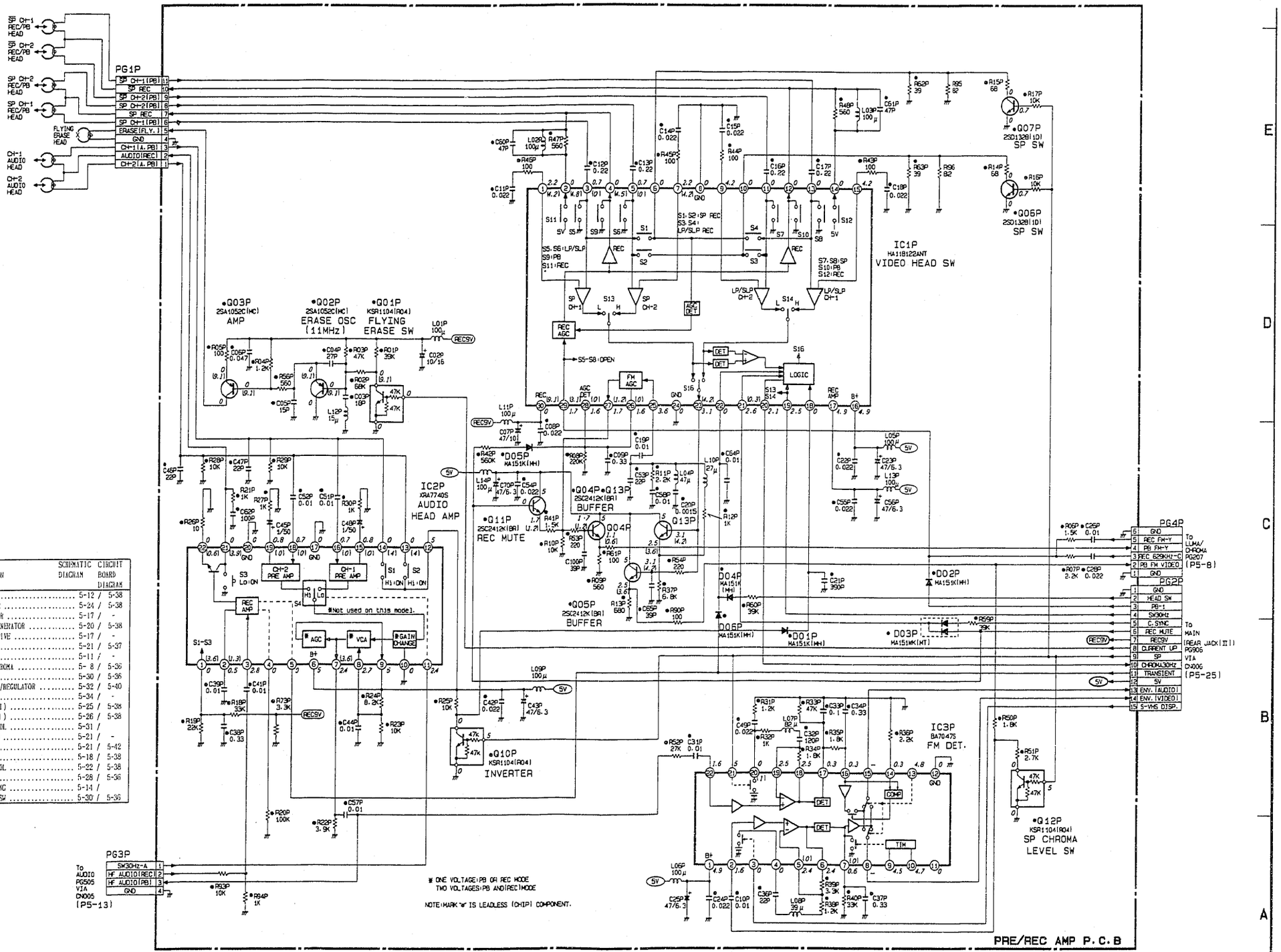
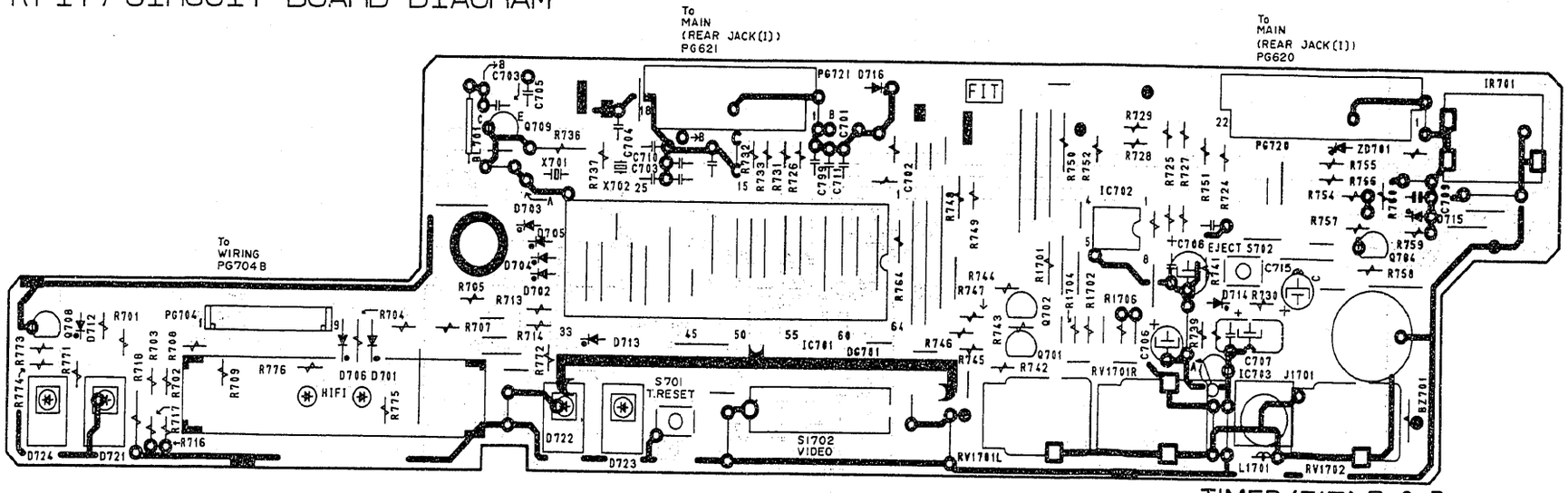


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
AUDIO	5-12	5-38
AUDIO-LINEAR	5-24	5-38
CAPSTAN MOTOR	5-17	-
CHARACTER GENERATOR	5-20	5-38
CYL.MOTOR DRIVE	5-17	-
FRONT JACK	5-21	5-37
IF	5-11	-
LUMINANCE/CHROMA	5- 8	5-36
PHONES JACK	5-30	5-36
POWER SUPPLY/REGULATOR	5-32	5-40
PRE/REC AMP	5-34	-
REAR JACK (II)	5-25	5-38
REAR JACK (I)	5-26	5-38
REMOTE CONTROL	5-31	
RF CONVERTER	5-21	-
SENSOR	5-21	5-42
SERVO	5-18	5-38
SYSTEM CONTROL	5-22	5-38
TIMER	5-28	5-36
U-V PLL TUNING	5-14	
WIRING/DOOR SW	5-30	5-36

* ONE VOLTAGE:PB OR REC MODE
TWO VOLTAGES:PB AND(REC)MODE

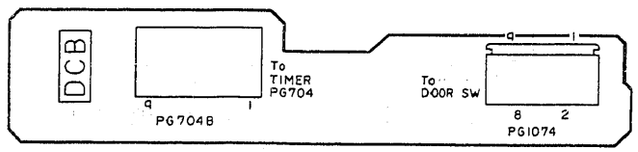
NOTE:MARK "*" IS LEADLESS (CHIP) COMPONENT.

TIMER(FIT) CIRCUIT BOARD DIAGRAM



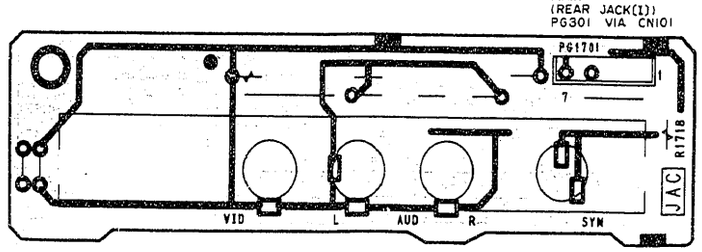
TIMER (FIT) P.C.B

WIRING(DCB) CIRCUIT BOARD DIAGRAM



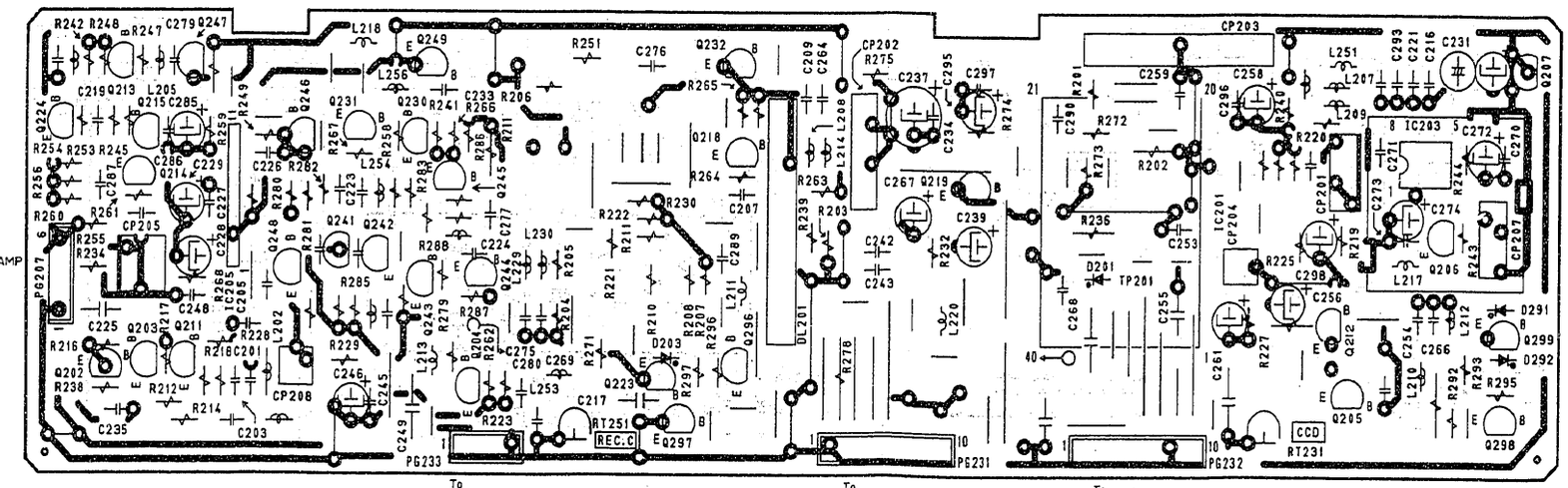
WIRING (DCB) P.C.B

FRONT JACK(JAC) CIRCUIT BOARD DIAGRAM



FRONT JACK (JAC) P.C.B

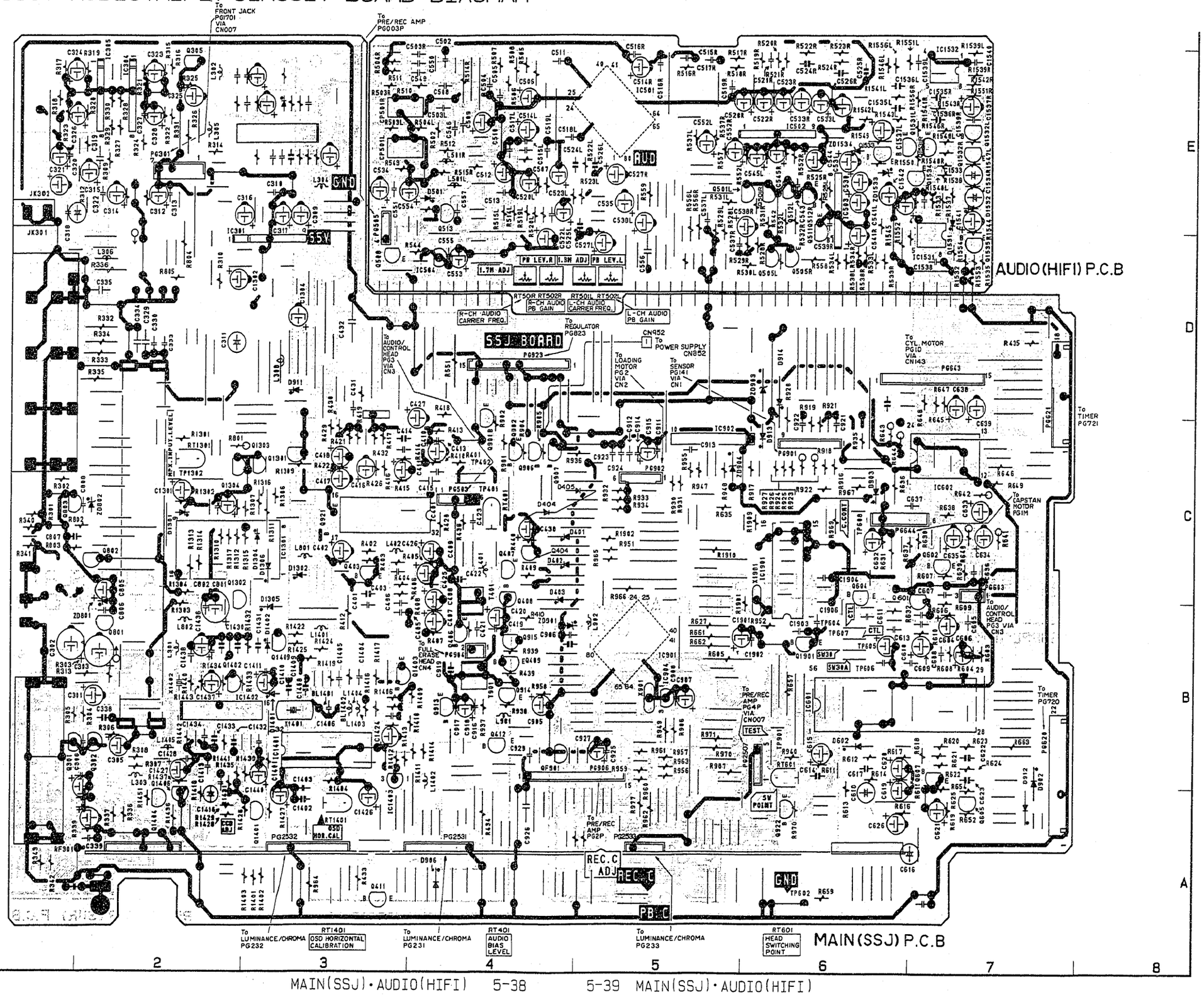
LUMINANCE/CHROMA(WYC) CIRCUIT BOARD DIAGRAM



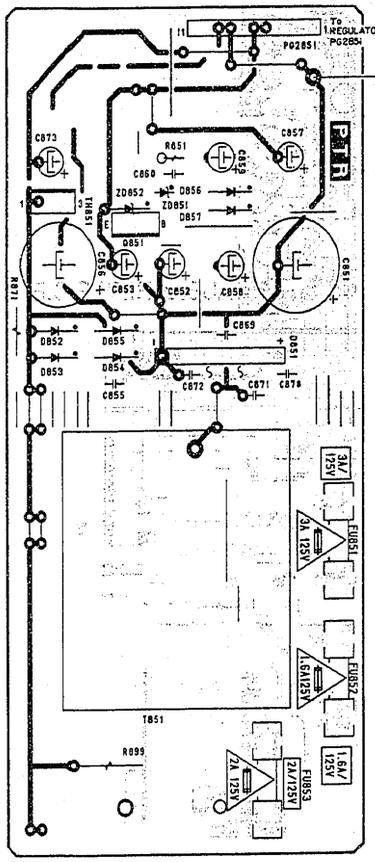
LUMINANCE / CHROMA (WYC) P.C.B

DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
AUDIO	5-12 /	5-38
AUDIO-LINEAR	5-24 /	5-38
CAPSTAN MOTOR	5-17 /	-
CHARACTER GENERATOR	5-20 /	5-38
CYL.MOTOR DRIVE	5-17 /	-
FRONT JACK	5-21 /	5-37
IF	5-11 /	-
LUMINANCE/CHROMA	5- 8 /	5-36
PHONES JACK	5-30 /	5-36
POWER SUPPLY/REGULATOR	5-32 /	5-40
PRE/REC AMP	5-34 /	-
REAR JACK (II)	5-25 /	5-38
REAR JACK (I)	5-26 /	5-38
REMOTE CONTROL	5-31 /	
RF CONVERTER	5-21 /	-
SENSOR	5-21 /	5-42
SERVO	5-18 /	5-38
SYSTEM CONTROL	5-22 /	5-38
TIMER	5-26 /	5-36
U-V PEL TUNING	5-14 /	
WIRING/DOOR SW	5-30 /	5-36

MAIN(SSJ)・AUDIO(HIFI) CIRCUIT BOARD DIAGRAM

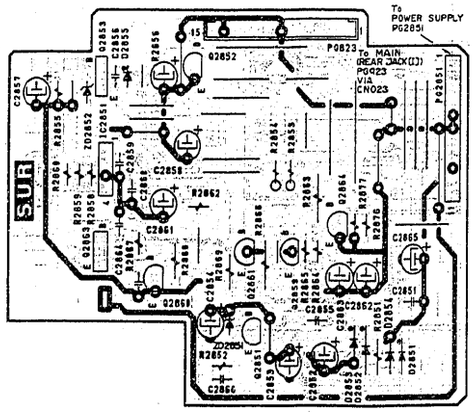


POWER SUPPLY(PTR) CIRCUIT BOARD DIAGRAM (For A)



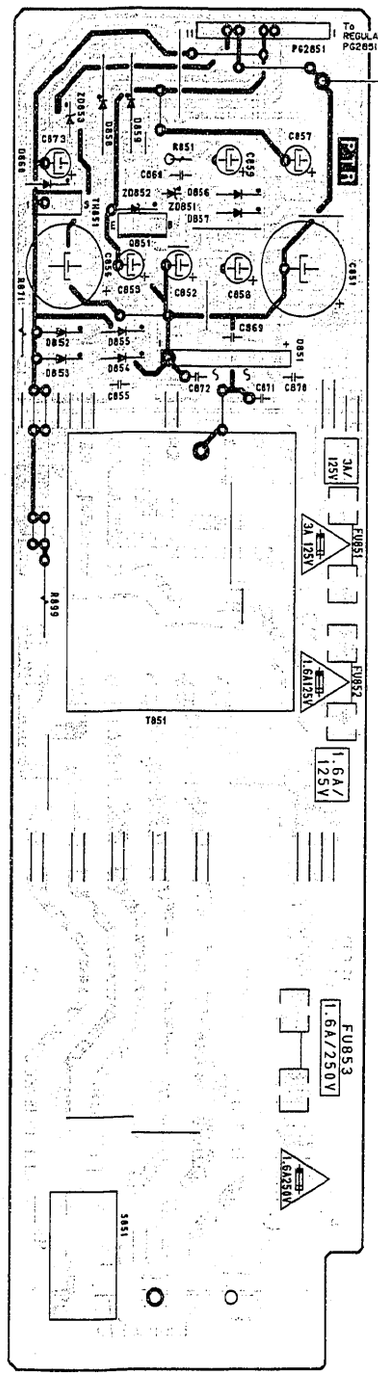
POWER SUPPLY(PTR) P.C.B (For A)

REGULATOR(SUR) CIRCUIT BOARD DIAGRAM (For A)



REGULATOR (SUR) P.C.B (For A)

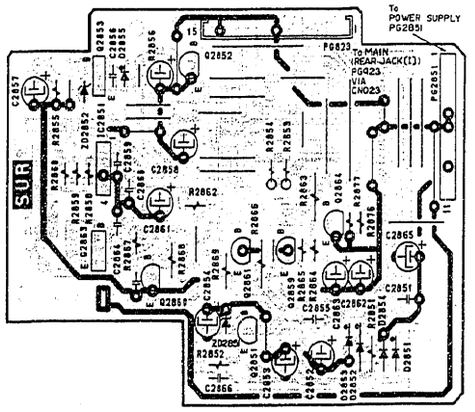
POWER SUPPLY(PTR) CIRCUIT BOARD DIAGRAM (For AW)



POWER SUPPLY(PTR) P.C.B (For AW)

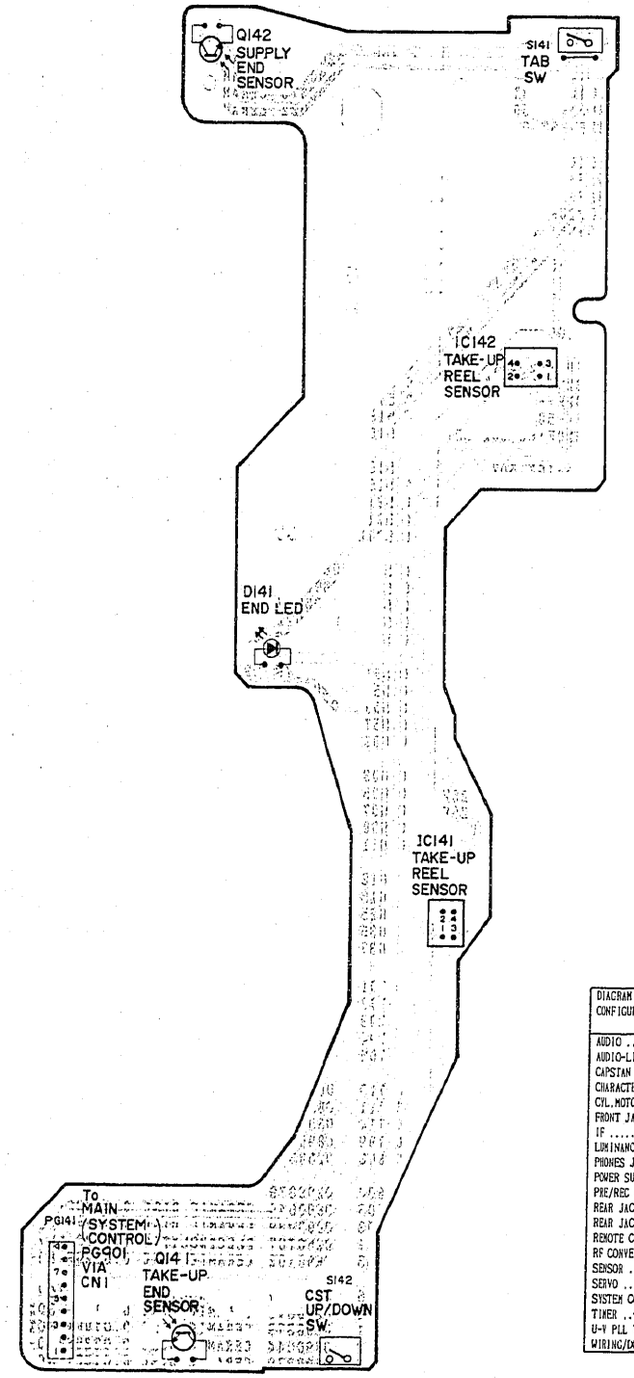
DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
AUDIO	5-12 /	5-38
AUDIO-LINEAR	5-24 /	5-38
CAPSTAN MOTOR	5-17 /	-
CHARACTER GENERATOR	5-20 /	5-38
CYL.MOTOR DRIVE	5-17 /	-
FRONT JACK	5-21 /	5-37
IF	5-11 /	-
LUMINANCE/CHROMA	5- 8 /	5-36
PHONES JACK	5-30 /	5-36
POWER SUPPLY/REGULATOR	5-32 /	5-40
PRE/REC AMP	5-34 /	-
REAR JACK (D)	5-25 /	5-38
REAR JACK (I)	5-26 /	5-38
REMOTE CONTROL	5-31 /	
RF CONVERTER	5-21 /	-
SENSOR	5-21 /	5-42
SERVO	5-18 /	5-38
SYSTEM CONTROL	5-22 /	5-38
TIMER	5-28 /	5-36
U-V PLL TUNING	5-14 /	
WIRING/DOOR SW	5-30 /	5-36

REGULATOR(SUR) CIRCUIT BOARD DIAGRAM (For AW)



REGULATOR (SUR) P.C.B (For AW)

SENSOR(MWB) CIRCUIT BOARD DIAGRAM



SENSOR(MWB) P.C.B

DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM.	CIRCUIT BOARD DIAGRAM
AUDIO	5-12 /	5-38
AUDIO-LINEAR	5-24 /	5-38
CAPSTAN MOTOR	5-17 /	-
CHARACTER GENERATOR	5-20 /	5-38
CYL.MOTOR DRIVE	5-17 /	-
FRONT JACK	5-21 /	5-37
IF	5-11 /	-
LUMINANCE/CHROMA	5- 8 /	5-36
PHONES JACK	5-30 /	5-36
POWER SUPPLY/RECULATOR	5-32 /	5-40
PRE/REC AMP	5-34 /	-
REAR JACK (D)	5-25 /	5-38
REAR JACK (I)	5-26 /	5-38
REMOTE CONTROL	5-31 /	
RF CONVERTER	5-21 /	-
SENSOR	5-21 /	5-42
SERVO	5-18 /	5-38
SYSTEM CONTROL	5-22 /	5-38
TIMER	5-28 /	5-36
U-V PLL TUNING	5-14 /	
WIRING/DOOR SW	5-30 /	5-36

REPLACEMENT PARTS LIST
ELECTRICAL PARTS LIST

SYMBOL-No	P-No	DESCRIPTION
		CAPACITORS
C 203	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 204	0890013	CERAMIC DISC 22PF+-5% 50V
C 205	0890013	CERAMIC DISC 22PF+-5% 50V
C 207	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 209	0890011	CERAMIC DISC 15PF+-5% 50V
C 216	0890016	CERAMIC DISC 39PF+-50% 50V
C 217	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 219	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 221	0890016	CERAMIC DISC 39PF+-50% 50V
C 222	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 223	0890012	CERAMIC DISC 18PF+-5% 50V
C 224	0890012	CERAMIC DISC 18PF+-5% 50V
C 225	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 226	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 227	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 230	0890038	CERAMIC DISC 3300PF+-20% 16V
C 233	0890015	CERAMIC DISC 33PF+-50% 50V
C 234	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 235	0890021	CERAMIC DISC 82PF+-10% 50V
C 242	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 243	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 245	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 249	0890031	CERAMIC DISC 470PF+-10% 50V
C 251	0890016	CERAMIC DISC 39PF+-50% 50V
C 253	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 254	0890017	CERAMIC DISC 47PF+-5% 50V
C 258	0256786	ELECTROLYTIC 2200UF 6.3V
C 259	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 260	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 264	0890014	CERAMIC DISC 27PF+-50% 50V
C 266	0890017	CERAMIC DISC 47PF+-5% 50V
C 268	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 270	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 271	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 273	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 277	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 278	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 279	0890019	CERAMIC DISC 68PF+-50% 50V
C 280	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 286	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 287	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 293	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 295	0256786	ELECTROLYTIC 2200UF 6.3V
C 296	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 297	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 299	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 306	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 310	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 313	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 327	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 329	0890036	CERAMIC DISC 1500PF+-20% 16V
C 330	0890036	CERAMIC DISC 1500PF+-20% 16V
C 333	0890036	CERAMIC DISC 1500PF+-20% 16V
C 334	0890036	CERAMIC DISC 1500PF+-20% 16V
C 335	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 405	0890041	CERAMIC DISC 6800PF+-20% 16V
C 410	0890029	CERAMIC DISC 390PF+-10% 50V
C 412	0890035	CERAMIC DISC 1000PF 50V
C 415	0890038	CERAMIC DISC 3300PF+-20% 16V
C 419	0890041	CERAMIC DISC 6800PF+-20% 16V
C 421	0890037	CERAMIC DISC 2200PF+-20% 16V
C 422	0204274	POLYESTER FILM 4700PF+-5% 100V
C 423	0890026	CERAMIC DISC 220PF+-10% 50V
C 426	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 431	0890037	CERAMIC DISC 2200PF+-20% 16V
C 432	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 502	0890022	CERAMIC DISC 100PF+-10% 50V
C 503L	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 503R	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 504	0890022	CERAMIC DISC 100PF+-10% 50V
C 505	0890028	CERAMIC DISC 330PF+-10% 50V
C 508	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 509	0890022	CERAMIC DISC 100PF+-10% 50V
C 511	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 513	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 515L	0890035	CERAMIC DISC 1000PF 50V
C 515R	0890035	CERAMIC DISC 1000PF 50V
C 516L	0890035	CERAMIC DISC 1000PF 50V
C 516R	0890035	CERAMIC DISC 1000PF 50V
C 517L	0890035	CERAMIC DISC 1000PF 50V
C 517R	0890035	CERAMIC DISC 1000PF 50V
C 518L	0890038	CERAMIC DISC 3300PF+-20% 16V
C 518R	0890038	CERAMIC DISC 3300PF+-20% 16V
C 519L	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 519R	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 521L	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 521R	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 537L	0890036	CERAMIC DISC 1500PF+-20% 16V
C 537R	0890036	CERAMIC DISC 1500PF+-20% 16V
C 543	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 546	0890022	CERAMIC DISC 100PF+-10% 50V
C 549	0890022	CERAMIC DISC 100PF+-10% 50V
C 550	0890022	CERAMIC DISC 100PF+-10% 50V
C 551	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 555	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 556	0890039	CERAMIC DISC 4700PF+-20% 16V
C 557	0890039	CERAMIC DISC 4700PF+-20% 16V
C 602	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 603	0890038	CERAMIC DISC 3300PF+-20% 16V
C 605	0890035	CERAMIC DISC 1000PF 50V
C 607	0890026	CERAMIC DISC 220PF+-10% 50V
C 608	0890014	CERAMIC DISC 27PF+-50% 50V
C 611	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 612	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 613	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 625	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 636	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C 637	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 701	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C 702	0256711	ELECTROLYTIC 47UF 6.3V
C 703	0890103	CERAMIC DISC 47000PF+80-20% 12V
C 704	0890009	CERAMIC DISC 12PF+-5% 50V
C 705	0890015	CERAMIC DISC 33PF+-50% 50V
C 710	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 711	0890035	CERAMIC DISC 1000PF 50V
C 714	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C 799	0890013	CERAMIC DISC 22PF+-5% 50V
C 802	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 804	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 806	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C 808	0890039	CERAMIC DISC 4700PF+-20% 16V
C 851	0256787	ELECTROLYTIC 4700UF 25V
C 855	0890102	CERAMIC DISC 0.022UF+80-20% 50V
C 856	0256864	ELECTROLYTIC 3300UF 16V
C 908	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 911	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 912	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 913	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 914	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 916	0890038	CERAMIC DISC 3300PF+-20% 16V
C 917	0208379	CERAMIC DISC 0.01UF+-30% 16V
C 919	0204273	POLYESTER FILM 6800PF+-5% 100V
C 921	0890035	CERAMIC DISC 1000PF 50V
C 922	0890035	CERAMIC DISC 1000PF 50V
C 923	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 924	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 925	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C 926	0890035	CERAMIC DISC 1000PF 50V
C1402	0208402	CERAMIC DISC 47PF+-5% 50V
C1403	0890017	CERAMIC DISC 47PF+-5% 50V
C1404	0890018	CERAMIC DISC 56PF+-50% 50V
C1405	0890018	CERAMIC DISC 56PF+-50% 50V
C1408	0208442	CERAMIC DISC 12PF+-5% 50V
C1409	0208442	CERAMIC DISC 12PF+-5% 50V
C1411	0208379	CERAMIC DISC 0.01UF+-30% 16V
C1419	0890034	CERAMIC DISC 820PF+-10% 5V
C1420	0890035	CERAMIC DISC 1000PF 50V
C1425	0208379	CERAMIC DISC 0.01UF+-30% 16V
C1428	0208379	CERAMIC DISC 0.01UF+-30% 16V
C1434	0890022	CERAMIC DISC 100PF+-10% 50V
C1438	0890037	CERAMIC DISC 2200PF+-20% 16V
C1532	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C1538	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C1539L	0890028	CERAMIC DISC 330PF+-10% 50V
C1539R	0890028	CERAMIC DISC 330PF+-10% 50V
C1540	0890039	CERAMIC DISC 4700PF+-20% 16V
C1902	0208379	CERAMIC DISC 0.01UF+-30% 16V
C1903	0208379	CERAMIC DISC 0.01UF+-30% 16V
C1904	0208379	CERAMIC DISC 0.01UF+-30% 16V
C1906	0890035	CERAMIC DISC 1000PF 50V
C2855	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C2856	0890043	CERAMIC DISC 0.01UF+-20% 16V
C2859	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C2860	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C2864	0890022	CERAMIC DISC 100PF+-10% 50V
C2867	0890044	CERAMIC DISC 0.022UF+80-20% 25V
		RESISTORS
R 515L	0101766	CHIP RESISTOR 12KOHM+-1% 1/8W
R 515R	0101732	METAL FILM 8.2KOHM 1/4W
⚠ R 871	0170492	FUSE RESISTOR 6.8 OHM 1/4W
RT 231	5030084	SEMI VARIABLE 1KOHM
RT 251	5030085	SEMI VARIABLE 2.2KOHM
RT 401	5030011	SEMI VARIABLE 100KOHM
RT 501L	5035077	SEMI VARIABLE 10KOHM
RT 501R	5035077	SEMI VARIABLE 10KOHM
RT 502L	5006239	SEMI VARIABLE 47KOHM
RT 502R	5006239	SEMI VARIABLE 47KOHM
RT 601	5030012	SEMI VARIABLE 220KOHM
RT1301	5035028	SEMI VARIABLE 22KOHM
RT1401	5035025	SEMI VARIABLE 2.2KOHM
RV1702	5002292	VARIABLE 10KOHM
		SEMI-CONDUCTORS
D 141	5380933	LED GL-451
D 201	5339491	DIODE 1N4531
D 203	5339491	DIODE 1N4531
D 291	5339491	DIODE 1N4531
D 292	5339491	DIODE 1N4531
D 401	5339491	DIODE 1N4531
D 402	5339491	DIODE 1N4531
D 403	5339491	DIODE 1N4531
D 404	5339491	DIODE 1N4531
D 405	5339491	DIODE 1N4531
D 501	5339491	DIODE 1N4531
D 602	5339491	DIODE 1N4531
D 701	5339491	DIODE 1N4531
D 702	5339491	DIODE 1N4531
D 703	5339491	DIODE 1N4531
D 704	5339491	DIODE 1N4531
D 705	5339491	DIODE 1N4531
D 706	5339491	DIODE 1N4531
D 712	5339491	DIODE 1N4531
D 713	5339491	DIODE 1N4531
D 714	5339491	DIODE 1N4531
D 715	5339491	DIODE 1N4531
D 716	5339491	DIODE 1N4531
D 721	5381001	LED SLR-34URC5
D 722	5381002	LED SLR-34MC5
D 723	1331101	LED SLH34DC3F
D 724	1331101	LED SLH34DC3F
⚠ D 851	5333351	DIODE D3SRA10
⚠ D 852	5339231	DIODE 1SR35-100A
⚠ D 853	5339231	DIODE 1SR35-100A
⚠ D 854	5339231	DIODE 1SR35-100A
⚠ D 855	5339231	DIODE 1SR35-100A
D 856	5339231	DIODE 1SR35-100A
D 857	5339231	DIODE 1SR35-100A
D 858	5330501	DIODE U0-5B SI 60HZ 3MW (For AW)
D 859	5330501	DIODE U0-5B SI 60HZ 3MW (For AW)
D 860	5339231	DIODE 1SR35-100A (For AW)
D 902	5339551	DIODE SS1J4
D 903	5339491	DIODE 1N4531
D 906	5339491	DIODE 1N4531
D 911	5339491	DIODE 1N4531
D 912	5339551	DIODE SS1J4
D 913	5339491	DIODE 1N4531
D 914	5339551	DIODE SS1J4
D1301	5339491	DIODE 1N4531
D1302	5339491	DIODE 1N4531
D1304	5339491	DIODE 1N4531
D1305	5339491	DIODE 1N4531
D1306	5339491	DIODE 1N4531
D1401	5339491	DIODE 1N4531
D1402	5339491	DIODE 1N4531
D1531	5339491	DIODE 1N4531
D1532	5339491	DIODE 1N4531
D2851	5339171	DIODE 1SS130
D2852	5339171	DIODE 1SS130
D2853	5339171	DIODE 1SS130
D2854	5339171	DIODE 1SS130
D2855	5339131	DIODE 1SS254
IC 141	5333954	IC ON2170R
IC 142	5333953	IC ON2170(Q)
IC 201	1373321	IC HT7263 (For A)
IC 201	1373311	IC HT7253 (For AW)
IC 203	1360231	IC MSM7400RS
IC 205	1371001	PWB ASSY VHS/S-VHS DISCRI
IC 301	1341691	IC NJM2234S
IC 304	5366981	IC M5201L
IC 305	5366981	IC M5201L
IC 401	1341493	IC XRA7767AS
IC 501	1351503	IC XRA7703K1-VP
IC 502	5366911	IC BA6138
IC 503	1361801	IC M5223L
IC 601	1360041	IC HD49741NT
IC 602	1360072	IC XRA6459P1

SYMBOL-No	P-No	DESCRIPTION
IC 701	1345651	IC M38102M5-120SP
IC 702	1367403	IC XRM9021A
IC 703	1340002	IC S-8053ALB
IC 901	1355682	IC UPD75516GF-319-3B9
IC 902	5300795	IC XRA6209U4
IC 904	1340112	IC PST520C
IC1301	1381181	PWB ASSY AUDIO MPX
IC1401	1342284	IC M50558-103SP
IC1402	1340021	IC NJM2229S
IC1403	5364601	IC M5278L05
IC1531	5350607	IC RC4558
IC1532	5350607	IC RC4558
IC1901	1345333	IC M50927-218SP
IC2851	1361881	IC PQ30RV11
Q 141	5324661	TRANSISTOR PT-4B3F1
Q 142	5324661	TRANSISTOR PT-4B3F1
Q 202	5327021	TRANSISTOR 2SA844CD
Q 203	5327021	TRANSISTOR 2SA844CD
Q 204	5327241	TRANSISTOR KSC945C (G)
Q 205	5327075	TRANSISTOR XDC144ES
Q 206	5327241	TRANSISTOR KSC945C (G)
Q 207	5327021	TRANSISTOR 2SA844CD
Q 211	5327241	TRANSISTOR KSC945C (G)
Q 212	5327075	TRANSISTOR XDC144ES
Q 213	5327021	TRANSISTOR 2SA844CD
Q 214	5327241	TRANSISTOR KSC945C (G)
Q 215	5327241	TRANSISTOR KSC945C (G)
Q 218	5327241	TRANSISTOR KSC945C (G)
Q 219	5327075	TRANSISTOR XDC144ES
Q 223	5327075	TRANSISTOR XDC144ES
Q 224	5327241	TRANSISTOR KSC945C (G)
Q 230	5327021	TRANSISTOR 2SA844CD
Q 231	5327241	TRANSISTOR KSC945C (G)
Q 232	5327075	TRANSISTOR XDC144ES
Q 241	5327021	TRANSISTOR 2SA844CD
Q 242	5327241	TRANSISTOR KSC945C (G)
Q 243	5327241	TRANSISTOR KSC945C (G)
Q 244	5327021	TRANSISTOR 2SA844CD
Q 245	5327241	TRANSISTOR KSC945C (G)
Q 246	5327075	TRANSISTOR XDC144ES
Q 247	5327075	TRANSISTOR XDC144ES
Q 248	5327076	TRANSISTOR XDA144ES
Q 249	5327075	TRANSISTOR XDC144ES
Q 296	5327031	TRANSISTOR 2SA673C
Q 297	5327075	TRANSISTOR XDC144ES
Q 298	5327031	TRANSISTOR 2SA673C
Q 299	5327075	TRANSISTOR XDC144ES
Q 301	1320012	TRANSISTOR 2SA933 (S,R)
Q 302	1320012	TRANSISTOR 2SA933 (S,R)
Q 305	5327351	TRANSISTOR KSR1004
Q 403	5327241	TRANSISTOR KSC945C (G)
Q 404	5327351	TRANSISTOR KSR1004
Q 406	5327101	TRANSISTOR 2SC3553(B/C)
Q 407	5327241	TRANSISTOR KSC945C (G)
Q 408	5327241	TRANSISTOR KSC945C (G)
Q 409	5327076	TRANSISTOR XDA144ES
Q 411	5327031	TRANSISTOR 2SA673C
Q 412	5327351	TRANSISTOR KSR1004
Q 501L	5327241	TRANSISTOR KSC945C (G)
Q 501R	5327241	TRANSISTOR KSC945C (G)
Q 505L	5327241	TRANSISTOR KSC945C (G)
Q 505R	5327241	TRANSISTOR KSC945C (G)
Q 508	5327241	TRANSISTOR KSC945C (G)
Q 511	5327351	TRANSISTOR KSR1004
Q 512L	5327211	TRANSISTOR 2SD655
Q 512R	5327211	TRANSISTOR 2SD655
Q 513	5327076	TRANSISTOR XDA144ES
Q 601	5327351	TRANSISTOR KSR1004
Q 602	5327241	TRANSISTOR KSC945C (G)
Q 604	5327241	TRANSISTOR KSC945C (G)
Q 605	5327241	TRANSISTOR KSC945C (G)
Q 607	5327351	TRANSISTOR KSR1004
Q 701	5327241	TRANSISTOR KSC945C (G)
Q 702	5327241	TRANSISTOR KSC945C (G)
Q 704	5327061	TRANSISTOR 2SC1740S-ST
Q 708	5327075	TRANSISTOR XDC144ES
Q 709	5327075	TRANSISTOR XDC144ES
Q 801	5327072	TRANSISTOR DTA124ES
Q 802	5327351	TRANSISTOR KSR1004
Q 803	5327071	TRANSISTOR DTC124ES
Q 851	1321341	TRANISITOR 2SD1765
Q 901	5327261	TRANSISTOR 2SB1326(Q)
Q 902	5327351	TRANSISTOR KSR1004
Q 906	5324631	TRANSISTOR 2SA1390C
Q 907	5327351	TRANSISTOR KSR1004
Q 913	5327101	TRANSISTOR 2SC3553(B/C)
Q 914	5327021	TRANSISTOR 2SA844CD
Q 915	5327351	TRANSISTOR KSR1004
Q 922	5327131	TRANSISTOR 2SB562C
Q1301	5327351	TRANSISTOR KSR1004
Q1302	5327076	TRANSISTOR XDA144ES
Q1303	5327351	TRANSISTOR KSR1004
Q1304	5327351	TRANSISTOR KSR1004
Q1401	5327241	TRANSISTOR KSC945C (G)
Q1402	5327241	TRANSISTOR KSC945C (G)
Q1403	5327075	TRANSISTOR XDC144ES
Q1404	5327241	TRANSISTOR KSC945C (G)
Q1406	1320012	TRANSISTOR 2SA933 (S,R)
Q1409	5327075	TRANSISTOR XDC144ES
Q1531L	5327241	TRANSISTOR KSC945C (G)
Q1531R	5327241	TRANSISTOR KSC945C (G)
Q1532L	5327241	TRANSISTOR KSC945C (G)
Q1532R	5327241	TRANSISTOR KSC945C (G)
Q1533	5327241	TRANSISTOR KSC945C (G)
Q1534	1320004	TRANSISTOR 2SA854SQR
Q1535	5327241	TRANSISTOR KSC945C (G)
Q1901	5327351	TRANSISTOR KSR1004
Q2851	5327031	TRANSISTOR 2SA673C
Q2852	5327075	TRANSISTOR XDC144ES
Q2853	1321341	TRANISITOR 2SD1765
Q2859	5327021	TRANSISTOR 2SA844CD
Q2860	5327075	TRANSISTOR XDC144ES
Q2861	5327021	TRANSISTOR 2SA844CD
Q2863	1321341	TRANISITOR 2SD1765
Q2864	5327241	TRANSISTOR KSC945C (G)
QF 901	5721941	I.C PROTECTOR
ZD 701	5339282	ZENER DIODE HZS6-B2
ZD 801	5339288	ZENER DIODE HZS30-3
ZD 802	5339276	ZENER DIODE HZS2-B2
ZD 851	5339284	ZENER DIODE HZS6-C3
ZD 852	5339279	ZENER DIODE HZS9B2
ZD 853	5339274	ZENER DIODE HZS15-3 (For AW)
ZD 901	5339262	ZENER DIODE HZS6-C2
ZD 903	5339465	ZENER DIODE HZS3B3
ZD 904	5339281	ZENER DIODE HZS11-A2
ZD1533	5339258	ZENER DIODE HZS7-C3
ZD1534	5339291	ZENER DIODE HZS3B1
ZD2851	5339254	ZENER DIODE HZS30-1
ZD2852	5339268	ZENER DIODE HZS11B2

SYMBOL-No	P-No	DESCRIPTION
		TRANSFORMERS
T 401	5261463	OSCILLATOR,BIAS
⚠ T 851	5214445	TRANFORMER,POWER (For A)
⚠ T 851	5214434	TRANSFORMER,POWER (For AW)
T 901	5261432	OSCILLATOR,BIAS
		COILS
L 202	5159145	CHOKE COIL 22UH
L 205	5159145	CHOKE COIL 22UH
L 207	5159141	CHOKE COIL 10UH
L 208	5159152	CHOKE COIL 68UH
L 209	5159147	CHOKE COIL 33UH
L 210	5159149	CHOKE COIL 47UH
L 211	5159077	CHOKE COIL 100UH+-10%
L 212	5159141	CHOKE COIL 10UH
L 213	5159077	CHOKE COIL 100UH+-10%
L 214	5121184	COIL 100UH
L 217	5159077	CHOKE COIL 100UH+-10%
L 218	5159077	CHOKE COIL 100UH+-10%
L 220	5159077	CHOKE COIL 100UH+-10%
L 221	5159141	CHOKE COIL 10UH
L 251	5159089	CHOKE COIL 820UH+-10%
L 253	5159149	CHOKE COIL 47UH
L 254	5159142	CHOKE COIL 12UH
L 255	5159146	CHOKE COIL 27UH
L 256	5159147	CHOKE COIL 33UH
L 301	5159077	CHOKE COIL 100UH+-10%
L 302	5159077	CHOKE COIL 100UH+-10%
L 305	5159077	CHOKE COIL 100UH+-10%
L 308	5159154	CHOKE COIL 100UH
L 401	5159077	CHOKE COIL 100UH+-10%
L 402	5159111	CHOKE COIL 5600UH
L 501L	5159077	CHOKE COIL 100UH+-10%
L 501R	5159077	CHOKE COIL 100UH+-10%
L 801	5159071	CHOKE COIL 33UH+-10%
L 802	5159077	CHOKE COIL 100UH+-10%
L 901	5159077	CHOKE COIL 100UH+-10%
L 902	5159077	CHOKE COIL 100UH+-10%
L1401	5159077	CHOKE COIL 100UH+-10%
L1403	5121291	COIL 33UH
L1404	5121291	COIL 33UH
L1405	5159077	CHOKE COIL 100UH+-10%
L1701	5159154	CHOKE COIL 100UH

SYMBOL-No	P-No	DESCRIPTION
		CRYSTALS
X 701	5784473	CRYSTAL
X 702	5780791	CRYSTAL
X 901	5784479	CRYSTAL
X1401	5781793	OSCILLATOR
X1402	5781781	CRYSTAL
X1901	5784476	CRYSTAL
		MISCELLANEOUS
BZ 701	5400071	BUZZER
CP 201	5164733	LOW PASS FILTER
CP 202	5165121	BAND PASS FILTER
CP 203	5165053	LC FILTER
CP 204	5165095	COIL,TRAP
CP 205	5163591	BAND PASS FILTER
CP 207	5163634	LOW PASS FILTER
CP 208	5162754	HIGHT PASS FILTER
CP 501L	5163101	BAND PASS FILTER
CP 501R	5163102	BAND PASS FILTER
DG 701	5315183	FLUORESCENT INDICATOR TUBE
DL 201	5786331	DELAY LINE
FE 801	5586572	TUNER IF BLOCK
⚠ FU 851	5721983	FUSE 3A
⚠ FU 852	5721405	FUSE 1.6A
⚠ FU 853	5721982	FUSE 2A(For A)
⚠ FU 853	5721470	FUSE 1.6A (For AW)
IR 701	5491527	PWB ASSY INF
J 701	5696301	PLTAE,JACK
JK 301	5696197	PLATE,JACK
JK 302	5673951	JACK
J1701	5673771	JACK
RF 301	5589332	RF CONVERTER
S 141	5635321	SWITCH
S 142	5635331	SWITCH
S 701	5635061	SWITCH
S 702	5635061	SWITCH
S 851	5605343	SWITCH (For AW)
S1702	5621461	SWITCH
TH 851	5390191	THERMISTOR CR8AM (For AW)

MECHANICAL PARTS LIST

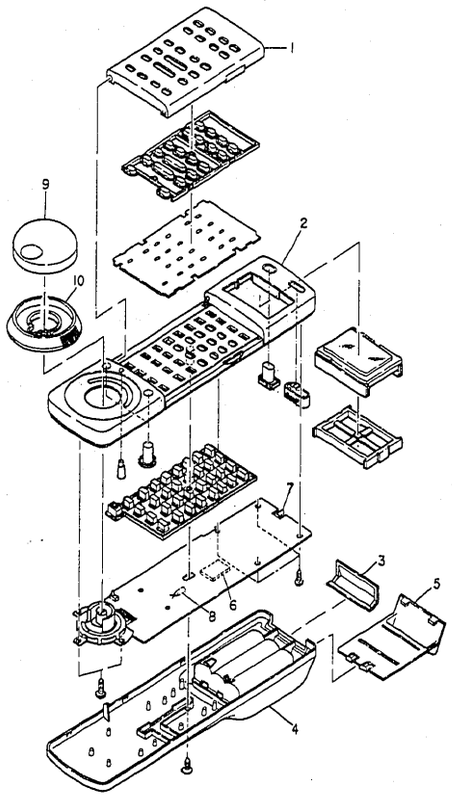
SYMBOL-No	P-No	DESCRIPTION
		FOR FINAL ASSEMBLY
101	6008651	COVER,TOP (For A)
101	6008656	COVER,TOP (For AW)
102	6811832	PIECE,REAR
103	6008671	COVER,BOTTOM
104	6489351	HOLDER
105	5602291	SWITCH (For A)
105	5602292	SWITCH (For AW)
106	6812371	DUMPER
108	4894162	BRACKET
109	6811931	DOOR UNIT
⚠ 110	5850753	CORD,POWER (For A)
⚠ 110	5850755	CORD,AC (For AW)
112	6443411	INSULATOR
113	6489436	PANEL,REAR
114	4721311	PANEL,FRONT (For A)
114	4721312	PANEL,FRONT (For AW)
115	4330291	FELT
116	7744291	FELT,LEG
117	6808941	STOPPER,DOOR
118	4730204	DOOR CASSETTE (For A)
118	4730206	DOOR,CASSETTE (For AW)
119	6551851	SPRING,DOOR
121	6811791	INDICATOR,LED
123	6338214	HINGE
125	6811871	HOLDER
127	4750711	KNOB
128	4750651	KNOB
129	4712421	PLATE,SIDE(L) (For AW)

SYMBOL-No	P-No	DESCRIPTION
130	4712431	PLATE,SIDE(R) (For AW)
131	4894227	BRACKET,TRANSFORMER (For A)
131	4894228	BRACKET,TRANSFORMER (For AW)
132	4898281	BRACKET
134	5886333	CORD
136	4342171	COVER
137	4341713	SPACER
138	6813171	HOLDET (For AW)
139	7429631	BRACKET
140	7429641	BRACKET
141	6529161	PLATE
142	6714216	NYLON RIVET (For AW)
143	6528881	PLATE
144	4330292	CUSHION
145	7744691	CUSHION
149	4343421	SPACER
150	4342761	SHEET (For AW)
202	6915922	SCREW
203	7469051	BASE
204	5434061	HEAD
205	6304906	SPRING
206	6522752	SPRING
207	7785673	NUT
208	6820333	BRAKE
209	6555504	SPRING
210	6416432	REEL,SUPPLY
211	7789123	POLYSLIDER WASHER
212	6416041	REEL,TAKE UP
213	7789123	POLYSLIDER WASHER
214	6975768	ARM,PRESSER ROLLER
215	6821684	BLOCK,SLIDER
216	7412823	PLATE
217	7429651	GEAR,LOADING(L)
218	7429661	GEAR,LOADING(R)
219	6915843	BASE,GUIDE ROLLER(IN)
220	7794884	ROLLER,GUIDE
221	6915862	BASE,GUIDE ROLLER(OUT)
222	6911004	BASE
223	5445851	HEAD FULL ERASE
224	7795111	ARM
225	4508237	GUIDE,TAPE
226	6555431	SPRING
227	7794953	BAND,TENTION
228	7469012	ARM
229	6555446	SPRING
230	6897265	BRACKET
231	6896752	ARM
232	6555061	SPRING
234	1390211	PWB ASSY PRE AMP
235	7795471	BLOCK,LOADING
236	7428089	BRACKET
237	7473201	BRACKET
238	6915891	ARM
239	7468972	ARM
240	7473191	BRACKET
241	6896906	BRAKE
242	6551152	SPRING
243	6804792	BRAKE
244	7795281	HOLDER,MOTOR
246	6821392	ARM
247	6555485	SPRING
248	6820151	ARM
249	6440551	GEAR,MODE
250	6440401	WORM WHEEL
251	6555052	SPRING
252	7799012	WASHER
253	7789124	WASHER
259	4508235	GUIDE
260	6806383	SHAFT
261	6916041	ARM
262	6440541	GEAR
263	6820322	BRAKE
266	6820103	ARM
269	6320576	SPRING
270	6556315	SPRING
271	6437873	GEAR
272	6440481	GEAR
273	6440491	GEAR
274	6437893	GEAR
275	7472092	BRACKET
276	7788348	WASHER
277	7472125	ARM
278	6814316	BRAKE,SUB
279	6807861	ARM
280	6821382	ARM
281	6556453	SPRING
286	7795483	BRACKET
287	6821642	ARM
288	6821631	ARM
289	6555061	SPRING
301	5571851	MOTOR,CAPSTAN
302	6821873	BASE,CYLINDER
303	6356641	BELT
304	6821841	ARM
305	6434852	RACK
306	7473311	BRACKET
307	6821621	ARM
402	6804982	BRACKET
403	6804962	BRACKET
404	6896971	WORM WHEEL ASSY
405	6435571	WORM
406	4508221	WORM SHAFT
407	6804992	BRACKET
408	6896632	ARM-SWITCH
409	6302474	SPRING
410	6897041	ARM-SWITCH
411	7412583	BRACKET-GEAR
412	7449179	HOLDER
413	7474441	BASE,HOLDER
414	6896664	HOLDER,CASSETTE (R)
415	7428113	HOLDER,STAY
416	6820361	ARM
417	6897001	ARM
418	6556241	SPRING
419	6896673	HOLDER,CASSETTE (L)
420	7412944	ARM
421	6555772	SPRING
422	7412953	SPRING
423	6806531	HOLDER,FRONT
424	7580791	SHAFT ASSY
425	7412552	BRACKET,SIDE(L)
426	7794391	WASHER
427	6323724	SPRING
501	5436501	CYLINDER (CY-Z7X6-W)
502	5571603	MOTOR,CYLINDER
503	5792635	BRUSH,CYLINDER
901	8699408	SCREW
902	8699412	SCREW (3X12) BLACK
903	8699416	SCREW(BT3X16)BLACK
904	8691308	SCREW BT2.6MMDX8MM

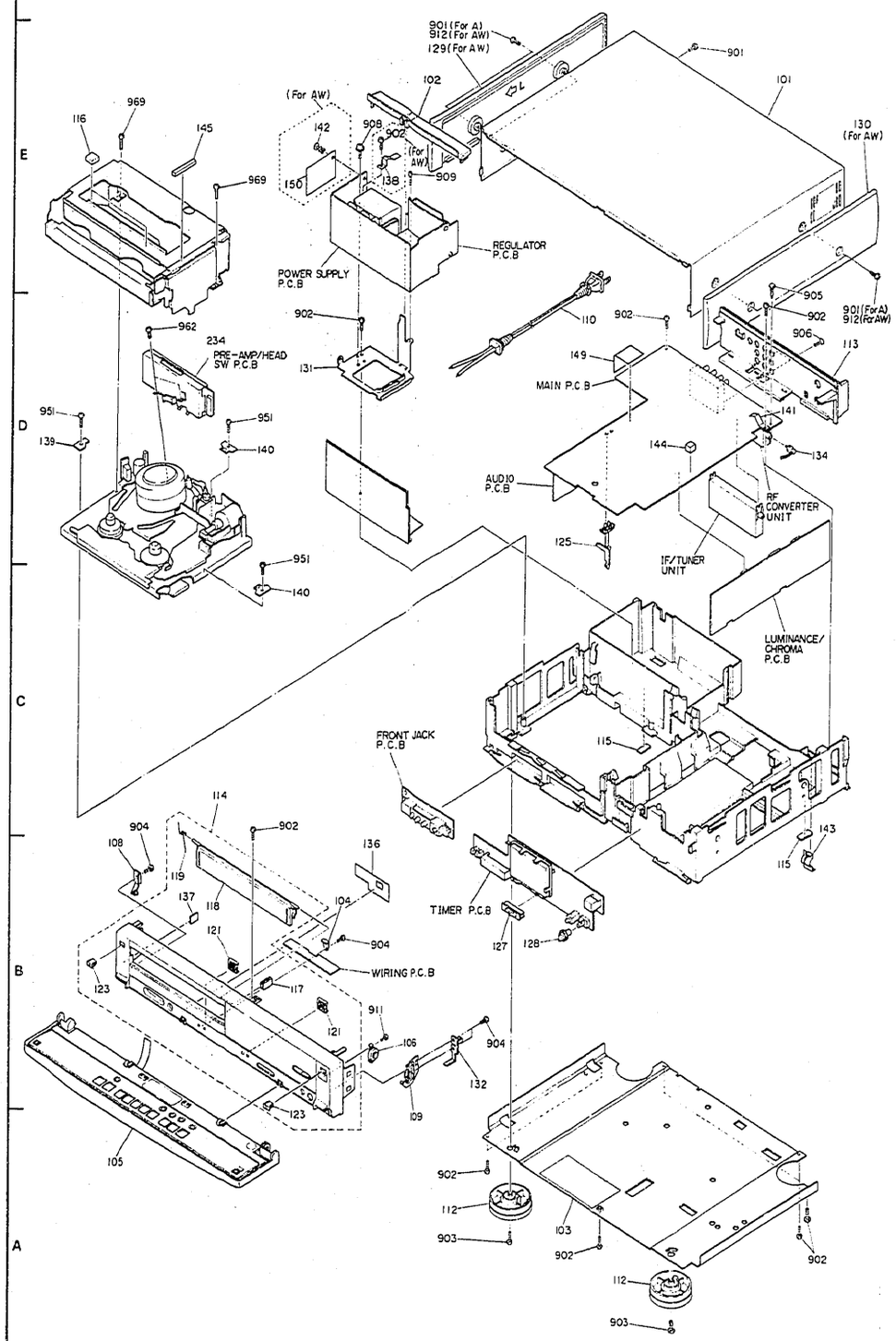
SYMBOL-No	P-No	DESCRIPTION
905	6714215	NYLON RIVET
906	7781582	FALT SCREW-3MMDX10MM (BLACK)
908	7785361	SCREW (4X14)
909	8691408	SCREW (3X8)
911	8691110	SCREW(2X10)
912	7785471	SCREW (3X20) (For AW)
951	8691410	SCREW
952	8691308	SCREW BT2.6MMDX8MM
953	8699408	SCREW
954	7781872	SCREW-3MMDX8MM
955	7773086	SCREW
956	8741414	SCREW (3X14)
957	8691412	SCREW (3X12)
958	8691408	SCREW (3X8)
959	8711406	SCREW - 3X6 PAN HEAD SCREW
960	8741412	SCREW (B3X12)
961	7785941	SCREW
962	8711404	SCREW - 3X4 PAN HEAD SCREW
963	8691308	SCREW BT2.6MMDX8MM
965	7775581	SCREW(M3X14)

SYMBOL-No	P-No	DESCRIPTION
966	8741416	BIND HEAD SCREW 3MMDX16MM
969	8741408	SCREW (B3X8)
970	7788341	WASHER
999	8711405	SCREW(3X5)
		FOR ACCESSARIES
	5860202	MINI CONNECTOR
	5856023	CORD
	5615651	REMOTE HAND SET
	5662611	SEIMENS PLUG (For AW)
		FOR REMOTE CONTROLLER UNIT
1	5615871	COVER
2	5615901	CASE, UPPER
3	5615931	PLATE
4	5615951	CASE,BOTTOM
5	5615941	LID,BATTERY
6	5616041	IC M50934-057
7	5616091	LED
8	5616051	CRYSTAL
9	5616031	KNOB,JOG
10	5616021	KNOB,SHUTTLE

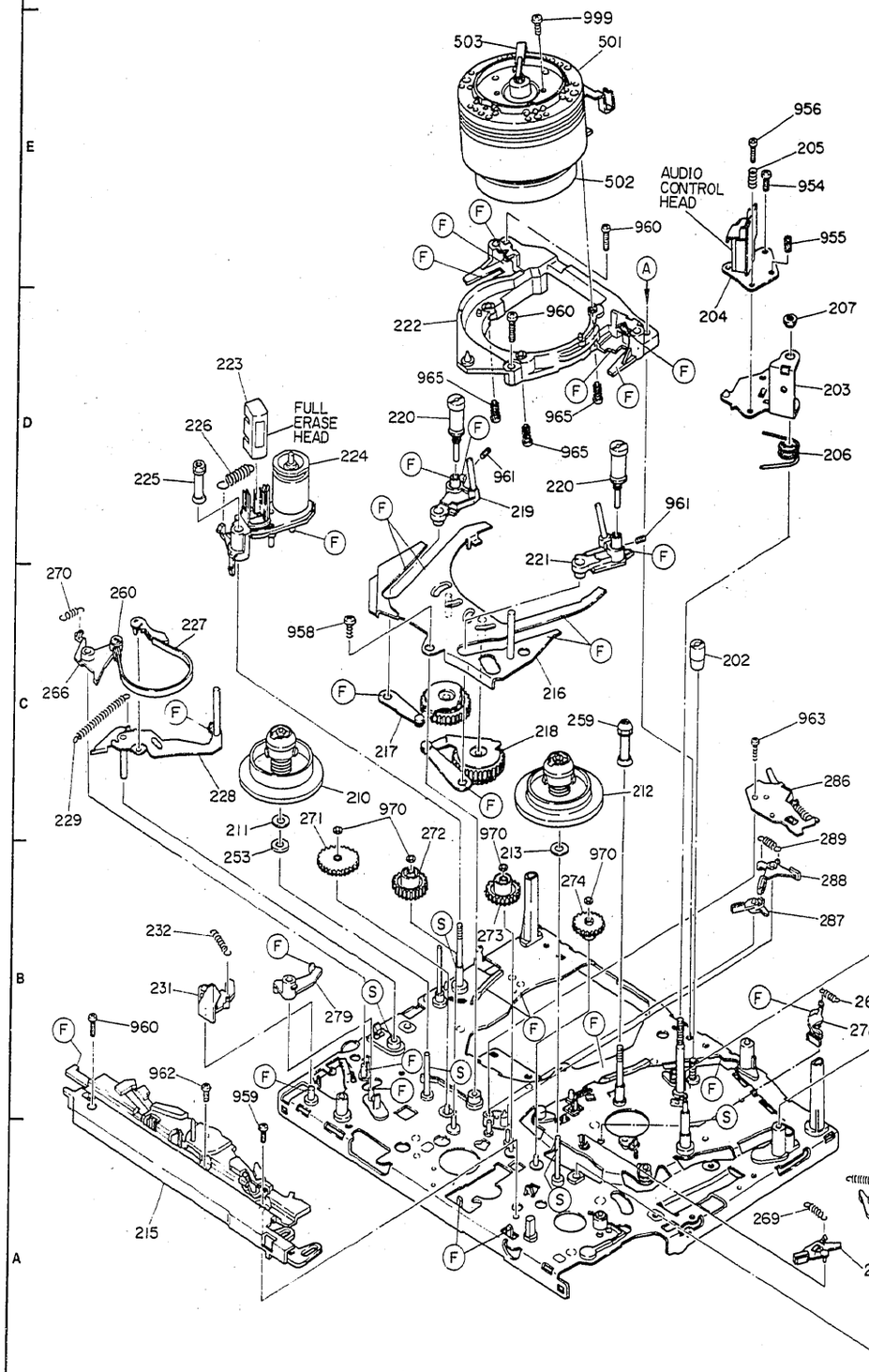
EXPLODED VIEW
REMOTE CONTROL SECTION



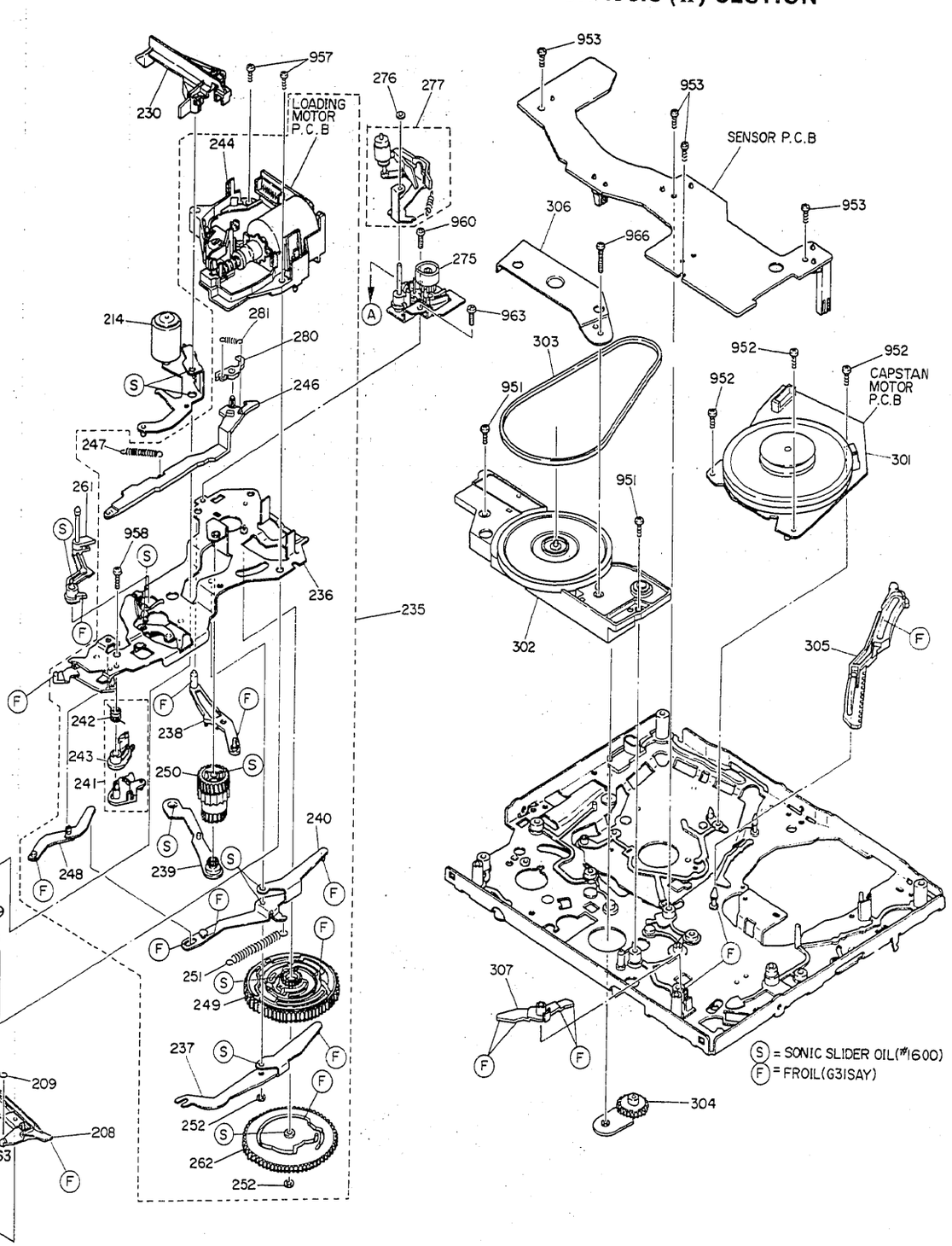
CABINET SECTION



CHASSIS (I) SECTION



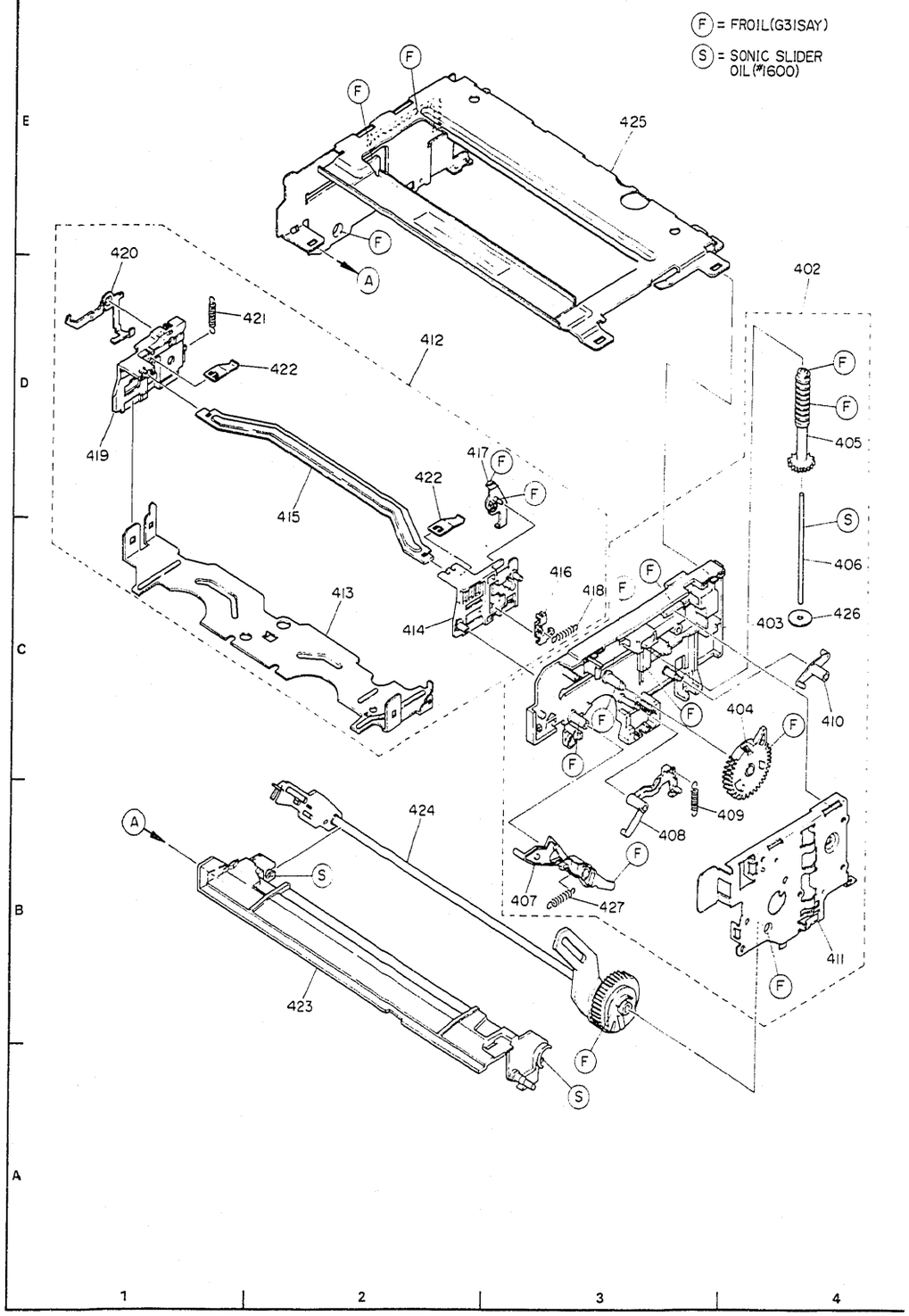
CHASSIS (II) SECTION



1 2 3 4 5 6 7 8

6-8 6-9

CASSETTE LOADING MECHANISM SECTION



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